COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER AND R. DAWSON HALL, *Editors.*

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And Yet!

THIS shall be a bare recital of facts, an unqualified record of a conflict of minds. The Central Competitive Field operator—one who mines, that is, in western Pennsylvania, Ohio, Indiana or Illinois or more than one of those districts—does not like the union, meaning the United Mine Workers of America. That organization does not keep its bargains; it does not assure peaceful operation; it is not reasonable; it does not give the operator who does business with it his due; it opposes the introduction of new and better machinery. As you listen to the operating man you wonder that he ever signed up with such a treacherous, unfair and unfaithful antagonist. And yet!

The union has one advantage. Its far-reaching biennial agreements, broken though they often are, have done something for permanence in operation. Just now southern Ohio, eastern Ohio and the Pittsburgh district have refused to make a contract, or, rather, to meet for the purpose of making one. Illinois and Indiana have consented. It is a known fact that Illinois has agreed to discuss terms, and the public has been told by President Lewis that Indiana also has given assent. What will happen if the Hocking region, the Pittsburgh vein operators of Ohio and the Pittsburghers refuse to make one? Just this, Illinois and Indiana will fear to sign a contract or will consent to sign for a short time only or without any time limitation, for may not the union if uncommitted make a better bargain with Ohio and Pennsylvania later or may not these districts make contracts with local bodies or the union go to the wall and understandings be made between individual operators and their men, and will not those agreements be for an unspecified time, liable to be revised at any moment if wages in the present non-union areas take another drop?

Unless the whole Central Competitive Region makes a scale and the rest of the unionized areas follow it, there will be no assurance that some important regions will not obtain lower wage scales and the area signing be obliged to close down. It seems clear that the whole Central Competitive Region or a still larger region must sign or it will not be safe for any section to make any kind of contract. If the larger area signs up the union will have funds to make the others sign and there will then be some assurance of stability—not for a time only but for two years. With stability assured, long-time contracts may be made, but with the possibility of undercutting nothing can be predicted. The industry becomes uncertain. Every mine is watching the scales of its neighbors and has no assurance of a consistent wage scale. Every operator keeps his pen poised ready to write, and tacks handy to post, a new scale for the morning of the day following. There can be no certainty in non-unionism; before the union came all was chaos. Nor will there be storage of coal by the consumer. He will buy what he wants when he wants it, hoping coal will be cheaper later on.

In Indiana and Illinois more than in most regions the miners have a good nucleus of men who have worked with one another for years. They largely own their own homes. They have opportunities to work on the broad acres around them. They have farmed the land for years. Consequently they are able to put up a vigorous resistance. If the operators in these states were to make a scale alone, it would be a high scale. Other regions where there were men of less homogeneity, less faith in one another, possessed less generally of a common tongue, not intermarried, tenants and not owners, with fewer farm lands to cultivate could drive a better bargain. Other sections where there are negroes and undigested aliens, few homes and no farms would drive one that was still lower, and Indiana and Illinois would have to nail up their buildings and wait and wait.

Consequently, Indiana and Illinois want the contract if it can be made broad enough. It is their defence against a competition in which they are the weaker parties. In fact all the Central Competitive Region feels in a degree that it would like a contract for the stability of wages and prices it affords, yet it would not be unfortunate for the eastern half of the region and for the areas around if Illinois and Indiana were bound hand and foot for two years and the rest of the coal fields were free.

But Illinois recalls a celebrated saying of one of its leading citizens that a nation cannot be "half bond and half free," and knows that the Middle West cannot endure to be alone under the bond. If it can only put the rest under the same yoke, well and good—that will be helpful—but if not, Illinois, Indiana and Iowa must be free and if the Eastern operators will not bind themselves there can scarcely be an agreement of any kind anywhere. The union must then be broken. There is almost no other way; none certainly that looks hopeful.

But everyone wants a more stable industry and, moreover, no one would like to see a competition that would bring wages to a level below the cost of living, below even the cost of subsisting, to sweat-shop levels. So despite all the anti-union talk, the destruction of the union seems fraught with mischiefs.

It might be possible, if indeed it is within the law, for the operators in the various regions to get together and formulate a scale and agree to keep it, but that would not bind new arrivals in the industry. Moreover, it is doubtful today that if the wage were

cut even 50 per cent the non-union mines would be prevented from making even more drastic cuts and from continuing to take all the business available, for the non-union areas are growing while the union areas are standing still. Union workers are migrating to non-union fields. Non-union mines are buying up-to-date machinery and so fortifying themselves to keep the business gained and preparing themselves to get more men and to produce a yet larger percentage of all the coal mined. No longer is the consumer obliged to buy coal from the well-unionized fields.

The non-unionized areas can in times of halting industry supply the market, and in fact so little is the demand and so great the supply of non-union fuel that between the non-union mines there is already the bitterest of competition. With the New River field and the Potomac fields already breaking from the union and with the promise of further union losses as soon as the operators in other fields are released of their obligations it seems that non-unionism is the safer bet. If there are not enough union mines to stabilize the industry a contract is unthinkable.

When all coal was regarded as equally valuable and it was not known that the non-union fuel was in a general way, yet with important exceptions, the best in heat-producing quality and in freedom from clinker, business could be done despite the undercutting of the non-union fields, which were then not so greatly developed. Yet in those early days at every lull in business the union almost entirely collapsed What shall be said of today, when the non-union fields produce so much and are known to produce such excellent coal? In idle times they seem to preclude the possibility of unionism. If the New River field with its excellent coal becomes non-union, as seems to be likely, one questions whether the large factor in the bituminous field may not be the non-union regions rather than the Central Competitive.

"Shout with the crowd," said Mr. Pickwick. "But if there are two crowds?" asked Mr. Snodgrass. "Then shout with the largest." Apparently the operators on the banks of the Allegheny and the Ohio are taking Mr. Pickwick's time-honored advice and have decided that the non-union areas constitute the larger crowd, if not in numbers or productive capacity at least as holding the key to the situation. And that being the case, they cannot make a contract with the union.

Is This a Square Deal?

A BARE 8-per cent salary increase in 74 years? One envisions a job whose importance has declined 100 per cent or so. Illogical as it may seem, the primary examiner in the United States Patent Office—scores of him—holds that unfortunate job. In 1848 his salary and that of the United States District Judge were fixed at $2,500. Today the judge gets from $7,500 to $10,000. The examiner, whose service to his country has broadened and deepened, gets $2,700.

His work is essential, if not vital. He passes upon an average of 1,500 applications every year, deciding whether they are valid, whether the alleged invention is novel as compared with the prior art, and whether that novelty rises to the dignity of an invention as distinguished from the mere skill of the calling. He is scientifically trained and an authority on patent law. And he has done his work so well, traditionally, that United States courts, in cases of patent infringement, customarily accept his findings as conclusive evidence. After years of experience in a given class of inventions the examiner becomes the most skilled man in that art in the United States. This is exactly as it should be. But $2,700 a year——!

"The general reclassification bill will provide for patent examiners," Floor Leader Mondell answered largely when the American Engineering Council urged him to bring the Lampert Patent Office Bill, H. R. 7077, before the House of Representatives for an immediate vote. "But," the engineers protested, "it will be at least eighteen months before the reclassification bill can take effect, and even then it will not go far enough in the Patent Office."

And those engineers are right. The United States Patent Office, from which Americans have a right to expect a near approach to infallibility, already suffers twenty gaps in its examining force. This considerably reduces the office's efficiency. What is worse, those young men who do become examiners—at $2,700—leave the government service for more lucrative work so early that the government—and the people—cannot benefit by the training given them.

All Americans have an interest in the Lampert bill to pay primary examiners $3,900—from increased patent fees—but it is of especial moment to the technical professions that this bill be passed at once.

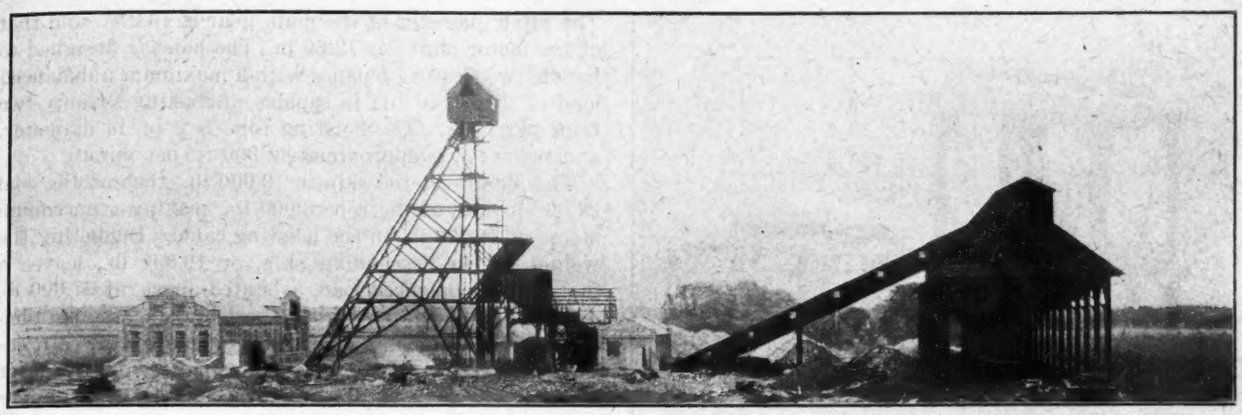
Passing of Fuel-Oil Menace

IN TIMES of low demand for coal the "fuel-oil menace" rises to plague the coal producer. In 1919 there was much investigating of and protesting at the influx of fuel oil from Mexico. The mine workers' union petitioned for an import duty to protect their members against the peon labor of Mexico. Along came the strike and the boom prices for coal in 1920, and oil was forgotten, save in isolated localities.

If it is economic waste to burn raw coal under boilers, as many proclaim, then it is economic crime to use petroleum products for steam raising. But the oil is here, it is a favored fuel and it has been priced to compete successfully with coal. The majority of the ships on the high seas are fuel-oil burners, the railroads west of the Rockies depend on oil, industries in New England, along the Atlantic seaboard and on the Gulf coast are large users of fluid fuel as against coal.

Mexico and its fabled gusher oil wells has been the chief source of imported fuel oil. In this issue we publish an article from the pen of one who is well and authoritatively informed on the Mexican oil situation. He reviews a situation that has been recognized for nearly a year in engineering circles, namely, that the heyday of Mexican fuel oil is over. Production, so called, from that region is really shipments from storage. The end of abundant fuel oil is at hand. It is perhaps significant, as pointed out by J. E. Pogue, in the *New York Evening Post*, that following the visit of certain oil magnates to Mexico last year, to investigate —the taxation problem—the price of domestic crude advanced in two months by 66 per cent, and oil shares on the stock market anticipated the rise in prices.

Imports of oil, mainly, of course, coming from Mexico, averaged around 10,000,000 barrels per month in 1921 —roughly equivalent to 2,500,000 tons of steam coal. The coal industry will welcome an increase in the market by this extent, even though it may come from the misfortune of the Mexican oil producers.



HOIST HOUSE, HEADFRAME OF MAIN HOISTING SHAFT, TIPPLE, CRUSHER HOUSE, CONVEYOR SHED AND LOADING BINS*

Standard Oil Co. of Indiana Develops Big Stoker-Fuel Mine in Macoupin County, Illinois

Designed for an 8,000-Ton Daily Output, Coal Weighed Underground, Hoisted in Skips, Crushed and Delivered to a Loading Bin Spanning Eighteen Railroad Cars, Nine of Which May Be Loaded Simultaneously

AT SCHOPER, ILL., about 9 miles northeast of Carlinville, the county seat of Macoupin County, a large coal-mining plant was recently completed for the Standard Oil Co. of Indiana. This firm controls some 25,000 acres of coal rights and owns about 1,500 acres of surface. The depth of the coal at this point is approximately 315 ft. and the thickness of the bed is 6 to 7 ft.

The plant is electrically driven throughout, no other form of power being used. Steam is generated but it is utilized for heating only. The mine is planned and equipped for a daily capacity of 8,000 tons, and the entire output will be used at the company's refineries in Woodriver, Ill., and Whiting, Ind.

Two shafts have been sunk, more than 12,000 ft. of entry have been driven and the surface plant erected. The shafts lie east and west from each other and 775 ft. apart. The main shaft has an excavated area of 11 ft. 6 in. x 21 ft. 6 in. Lined with reinforced concrete, this gives a clear cross-section of 7 ft. x 17 ft. This shaft contains two hoisting compartments in each of which a 12-ton self-dumping Kimberley skip rises and falls between 60-lb. rail guides. The material shaft has an excavated area of 18 ft. 6 in. x 35 ft. 6 in. With a reinforced-concrete lining this affords a finished shaft area of 14 x 31 ft.

This shaft contains separate compartments accommodating respectively the ventilating current, a stairway, a double-deck man cage and a single-deck material cage. Both cages are used for hoisting men, but the double-deck cage is utilized also as a counterweight to the material cage. Special counterweight cars are kept on the bottom to be placed on this cage when heavy equipment is being moved in the shaft.

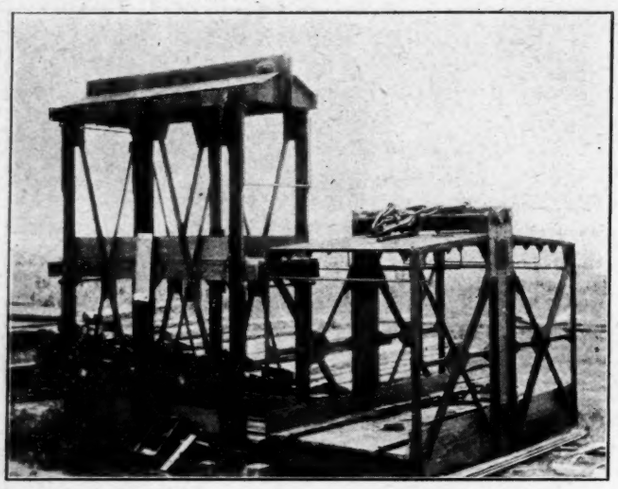
In lining the shafts a collapsible, or knock-down, wooden form of original design was used, so contrived that the heaviest unit easily could be handled by one man. It was set and stripped in units, and consisted of lagging made of 3 x 10-in. yellow pine, corner posts of 6 x 6-in. timber and lockbars of 3 x 8-in. material. A 6-ft. length of lining was poured at each set-up.

Concrete was mixed in a 21-cu.ft. drum mixer and

CLOSE-UP VIEW OF MAIN-SHAFT HEADFRAME, TIPPLE AND CRUSHER HOUSE

Coal may be dropped into railroad cars as run-of-mine, a track under the tipple being provided for that purpose, or it may be dropped on two 54-in. feeder conveyors and delivered to bar screens, the oversize going to two crushers. The coal thus crushed to 1¼-in. size is discharged onto a 60-in. apron conveyor which takes it to the loading bins, where two 72-in. flat-top conveyors with the aid of plows discharge it at various points in the bin.

*Note how far it is from the tipple to the storage bins. Seen end on the unusual size of the loading bins is not readily apparent. The bins are 360 ft. long and 40 ft. wide, and eighteen railroad cars can be placed beneath them.



TWO-DECK MAN CAGE AND MATERIAL HOIST

The one is a counterweight to the other. Though the one is termed, specifically, a material hoist, it is used like the other for the hoisting and lowering of men.

shot down the shaft through a 4-in. pipe, to the bottom of which a flexible, jointed grain chute was attached by means of which the concrete was distributed directly to the lining. A sufficient number of forms were made to allow one to remain in place until the concrete had thoroughly set. The cycle of operations followed required that one form be poured every day. It was found, however, that one and one-half to two forms could sometimes be poured in twenty-four hours.

The main-shaft hoisting unit is an Allis-Chalmers electric machine of the double-drum geared type. The drums are cylindro-conical with a maximum diameter of 11 ft. 6 in. and a 4-ft. face between flanges. This hoist is driven through single-reduction herringbone gears. The pitch diameter of the main gear is 13.2 ft. and that of the motor pinion is 12.66 in. The hoist is designed to handle two skips in balance with a maximum unbalanced load of 27,000 lb. It is capable of making seventy-two trips per hour. The hoisting rope is 2 in. in diameter, and the speed is approximately 900 ft. per minute.

The weight of the skip is 19,000 lb., that of the coal 24,000 lb. and of the rope 3,000 lb., making a maximum stress of 46,000 lb. on the hoisting cable. Deducting the weight of the descending skip, or 19,000 lb., leaves a maximum unbalanced load, as stated above, of 27,000 lb.

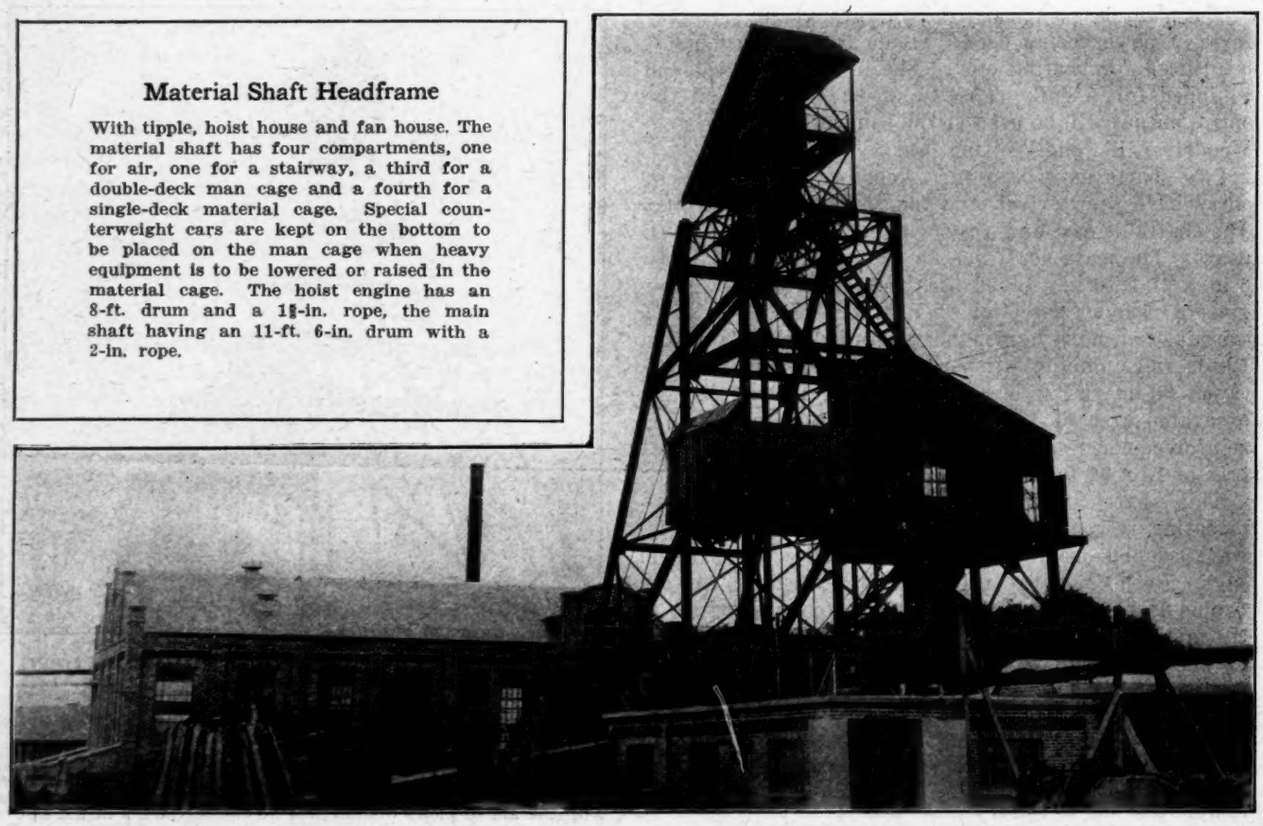
The hoist is equipped with a post brake of the parallel-motion type which is operated by an auxiliary air engine, the crosshead of which is connected to the lever arms carrying the brake weight. The brake engine is of the vertical type, having a 6-in. oil cataract cylinder arranged in tandem with a 6-in. air cylinder. It is provided with an auxiliary valve operated by a solenoid connected with the overwinding device.

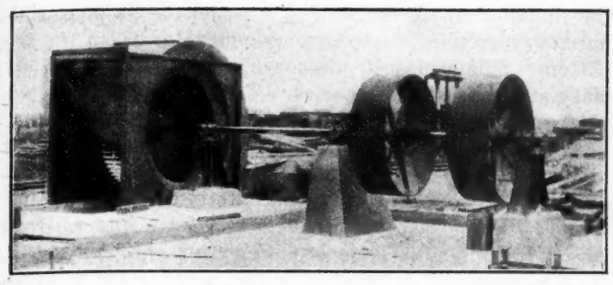
When the current is on this auxiliary valve is held closed by means of the solenoid, which is so connected that, if the current fails because of an interruption of electrical service or to its being cut off by the switch on the overwinding device, a weighted lever will be released. This operates the auxiliary valve and releases the air pressure on the lower side of the brake engine piston, shutting off the air supply to the engine. This allows the brake to set by gravity, thus bringing the hoist to a stop.

The hoist is further protected both by an electrical interlocking device between the brake lever and the controller lever and by a retardation mechanism. This machine is driven by a 900-hp. 2,200-volt 60-cycle 3-phase Allis-Chalmers motor having a synchronous speed of 360 r.p.m. and a full load speed of 353 r.p.m. The motor is controlled by a liquid rheostat of the regulating-weir type which is provided with the necessary circulating

Material Shaft Headframe

With tipple, hoist house and fan house. The material shaft has four compartments, one for air, one for a stairway, a third for a double-deck man cage and a fourth for a single-deck material cage. Special counterweight cars are kept on the bottom to be placed on the man cage when heavy equipment is to be lowered or raised in the material cage. The hoist engine has an 8-ft. drum and a 1⅛-in. rope, the main shaft having an 11-ft. 6-in. drum with a 2-in. rope.





VENTILATING FAN BEFORE ITS HOUSING WAS ERECTED

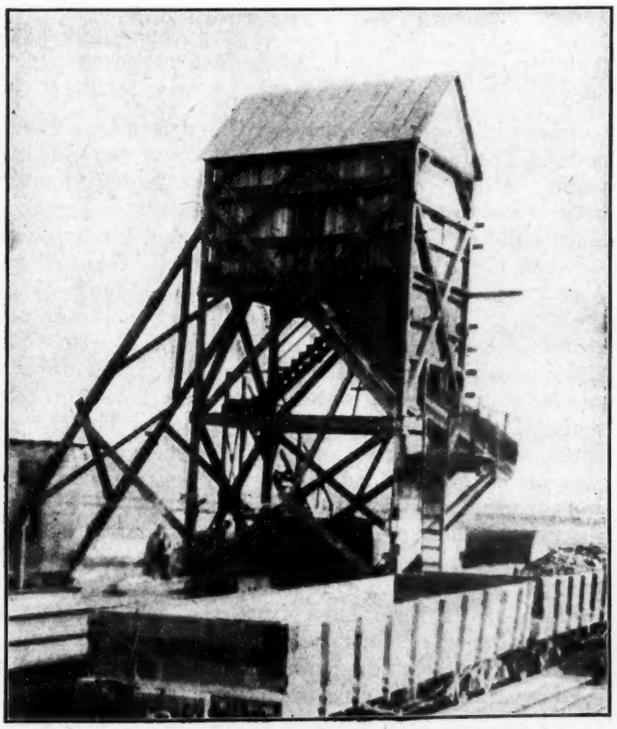
The fan measures 7 ft. x 3 ft. 6 in. and is a double inlet multivane fan having reversing damper, reversing inlets and explosion and air-lock doors. It will make 100,000 cu.ft. of air per minute at a speed of 150 r.p.m. against a static pressure of 2¼ in. of water. Raising the speed to 400 r.p.m. it will deliver 133,300 cu.ft. of air against a static pressure of 4 in. of water.

pump, cooling coils and master switch. A motor-driven reversing switch is used.

The material shaft hoisting unit is an Allis-Chalmers unbalanced single-drum electric machine. The drum is 8 ft. in diameter with a face 4 ft. long between flanges. This hoist is driven through single-reduction herringbone gears. The pitch diameter of the main gear is 7.6 ft. and that of the motor pinion is 11 in. The rope speed is approximately 600 ft. per minute, and the motor operates at 390 r.p.m. The hoisting rope in this shaft is 1⅝ in. in diameter.

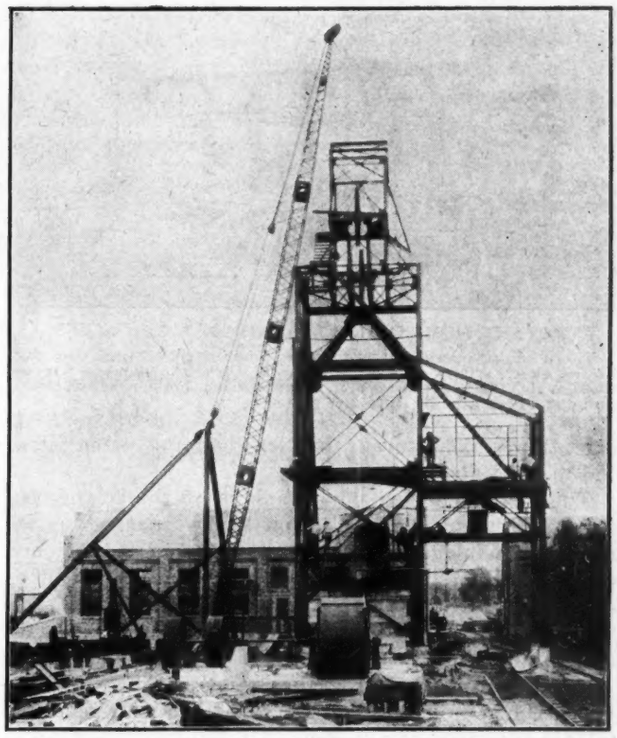
This hoist is driven by a 250-hp. 2,200-volt 60-cycle 3-phase Allis-Chalmers motor having a synchronous speed of 400 and a full-load speed of 390 r.p.m. The control and braking device is similar to that of the main hoist except that the reversing switch is operated by solenoids. Each hoisting unit is equipped with a 20-cu.ft. motor-driven compressor for supplying the air necessary to operate the brake engines.

The ventilating fan is an 84 x 42-in. double-inlet



TIPPLE USED IN SINKING SHAFT

The spoil was discharged into railroad cars and hauled away from the plant by locomotives. It will be noted in other illustrations that the ground is not filled in by the waste from shaft construction.



MATERIAL HEADFRAME UNDER ERECTION

The back stays had not been erected when the photograph from which this illustration was made was taken. In the rear will be seen the hoist house and in the foreground the fan and its foundation.

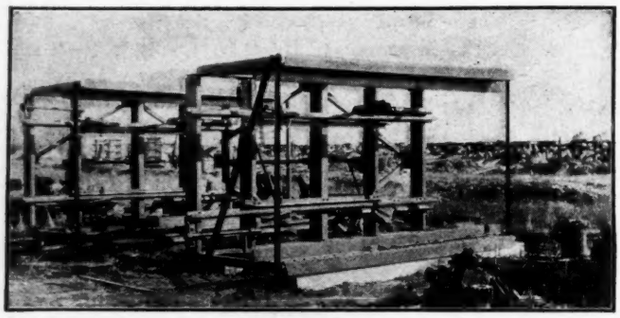
Sirocco wheel fitted with the necessary housing, reversing damper, reversing inlets and explosion and air-lock doors. The fan has a normal capacity of 100,000 cu.ft. of air per minute against a static pressure of 2¼ in. of water at a speed of approximately 150 r.p.m. At a speed of 200 r.p.m. this machine will deliver 133,300 cu.ft. of air per minute against a static pressure of 4 in. of water.

At present this fan is driven by a 35-hp. motor, which will be used during the early development of the mine, but after the operation has grown beyond the capacity of the fan with the present motor the drive will be changed to two 150-hp. 3-speed motors having synchronous speeds of 300, 450 and 600 r.p.m. One of these motors will be held as a spare.

Coal-loading arrangements on the main bottom consist of two motor-operated rotary dumps descharging into the storage hoppers, whence the coal will go into a measuring hopper before being automatically loaded into the skips. The descending skip deflects the discharge chute into such a position that the coal discharges into the skip only after this device has reached its lowest point. The descending skip also trips a trigger which controls an air-operated cut-off gate. All this equipment was furnished by the Link-Belt Co.

Pit cars enter the dumps from a motor-driven car haul. They are weighed while in motion on a 15-ton railroad scale provided with a Streeter-Amet recording device. These cars are of 6-tons capacity each and are equipped with roller-bearing wheels.

Two 300-kw. synchronous motor-generator sets with direct-driven exciters have been installed in a room on the bottom near the material shaft. The motors operate on 2,300-volt 60-cycle 3-phase alternating current and the direct-current generators have a continuous capacity of not less than 1,080 amp., a voltage of 275 for day



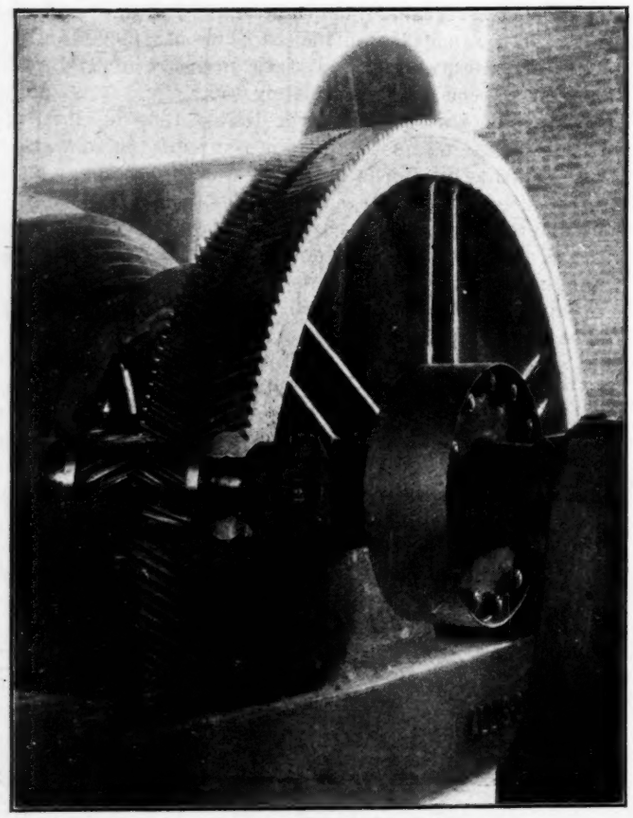
ROTARY DUMPS TILTED OVER ON THEIR SIDES

These motor-operated dumps are now in place near the foot of the shaft. They discharge the coal cars into storage hoppers from which the coal passes to a measuring hopper before being dumped automatically into the skips.

operation and a storage battery-changing potential of 135 to 185 volts.

The equipment for mine haulage at this plant consists of General Electric 15-ton trolley locomotives for main-line haulage and 6-ton combination battery and trolley machines for gathering. The mining machines employed are Sullivan ironclads of the shortwall type. The mine track is of 48-in. gage laid with 60-lb. steel on the main bottom and 40-lb. on the haulage entries.

Power is furnished from the Standard Oil Co.'s power house a half mile west of the mine. It is transmitted to this operation at a voltage of 6,600 through a 3-conductor 500,000-c.m. lead-covered cable laid underground. Main and material hoists each have a bank of oil-insulated air-cooled 6,600 to 2,300-volt transformers. The lead to the mine is a 3-conductor 500,000-c.m. lead-covered armored cable suspended in the air compartment of the material shaft connecting a panel on the material-hoist switchboard to the motor-generator room on the bottom. The trolley feeders are single-conductor 750,000-c.m. wire-armored cables. The trolley wire is No. 0000 grooved.

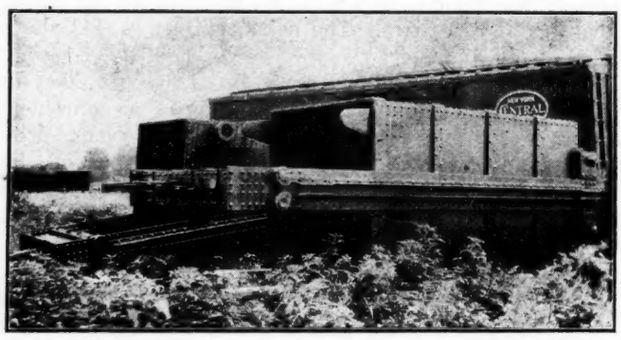


GEARS ON THE MAIN HOISTING ENGINE

Single reduction herringbone gears are used. The main gear is 13.2 ft. in diameter, and the motor pinion which drives it 12.66 in. The reduction is, therefore, roughly 12¼ to 1. Note the cylindro-conical drum on the left.

An elaborate system for handling the coal after it leaves the main hoist tipple has been devised. The self-dumping skips deliver their contents into receiving bins, whence the coal can be discharged directly into railroad cars if run-of-mine is to be shipped or onto two 54-in. feeder conveyors delivering to bar screens from which the oversize is dropped to two American Pulverizer Co.'s crushers each having a capacity of 500 tons per hour. These reduce the coal to 1¼ in. in size and discharge it upon a 60-in. apron conveyor, which in turn delivers it to the loading-bin conveyors. Screenings drop directly upon the apron conveyors, each of which is driven by a 75-hp. motor. They are each 137 ft. 6 in. long from center to center of head and tail shafts.

The loading bin is 360 ft. long and 40 ft. wide. It is built of structural steel and plate and stands upon concrete foundations. It is served by two 72-in. flat-top conveyors that receive the coal from the apron conveyors and discharge it at various points over the bin



KIMBERLEY SKIPS AWAITING ERECTION

These skips have a capacity of 12 tons and run between 60-lb. rail guides. Each skip weighs 9½ tons. The maximum stress on the hoisting cable is 23 tons.

by means of plows. Each conveyor is driven by a 25-hp. motor. The bin is so arranged as to cover two nine-car trains. Every car of a train can be loaded simultaneously and each train alternately.

All buildings other than the tipple and bin are constructed of brick on reinforced-concrete foundations. All have steel roof trusses and 2-in. matched-lumber roof sheeting. The main- and material-hoist buildings are roofed with slate, the office and change house with 3-ply bituminous roofing, and the heating plant, fan house and powder magazine with waterproofed reinforced-concrete roof slabs. Steel sash is used throughout. The change house contains lockers and overhead hangers for 300 men. It also is provided with twenty-four shower heads and the usual sanitary equipment.

All the buildings are heated from a central heating plant with the exception of the main-hoist house, which is fitted with a hot-air furnace. This was necessary because of its remoteness from the heating station. The heating plant furnishes hot water for the change house and office building and contains sand bins and a sand dryer as well as a fireproof room for oil storage.

The railroad yard contains approximately four miles of trackage laid with 85-lb. rails. It also contains twenty-six turnouts. A 14-ft. roadbed is maintained with 12 in. of cinder ballast under the ties.

This coal-mining plant was conceived by E. M. Clark in 1916, then superintendent of the Woodriver refinery but now director and general superintendent of the Standard Oil Co. of New Jersey. Development of the property was started under his administration in December of 1917. Mr. Clark was succeeded in September, 1918, by C. B. Manbeck, under whose administration the project was completed and is now being operated. Curtis W. Clark is resident manager in charge of operations. Robert W. Hunt & Co. was the consulting engineer. The mining plant was built, the shafts sunk and the mine opened by B. G. Slining, of Chicago.

Determining Meridian by Observations of Polaris at Any Time of the Night

Observation of Polaris at Elongation Requires No Calculation—Observation at Culmination Liable to Error—Observation at Any Time Necessitates Calculations, Which Are Fully Explained and Illustrated

BY A. C. CALLEN*

DETERMINATION of meridian by observation of Polaris at elongation is a favorite method with many surveyors on account of its simplicity and freedom from calculations. Its main disadvantage is that it frequently involves work in the small hours of the morning, and even if the engineer does not mind being called out at about 3 a.m. on a frosty morning he may find the star hidden by a cloud just when he is ready to make the observation.

An observation at culmination is possible but any error in the chronometer or in the calculation of the time of culmination is serious, for at culmination the azimuth of Polaris is changing at a rate greater than 20″ per minute.

To calculate the azimuth of Polaris at any particular time of observation is possible but the average engineer or surveyor is very likely to be unfamiliar with the calculations and may easily make a mistake, particularly in changing mean time to siderial time.

The method described by D. J. Brown in *Coal Age*, vol. 1, p. 245, gives a graphical solution for observations taken at any time, and if the observations are carefully made and a suitable scale selected for plotting, the results should be correct within one minute or less.

POLARIS MAKES SMALL CIRCLE ABOUT THE POLE

A brief description of the underlying theory will show the simplicity and accuracy of the method. Polaris apparently moves in a small circle about the pole. Its distance from the pole measured on a great circle is called the polar distance and is equal to 90°—declination of Polaris. The polar distance at the present time is about 1° 6′ 40″.

If Polaris could be followed through the telescope of an engineer's transit for twenty-four hours and the plate and vertical circle readings recorded at frequent intervals and then plotted on cross-section paper, the apparent path of Polaris would be an ellipse because the abscissas (plate readings) would represent azimuths of the star, and the maximum abscissa, the azimuth of Polaris at elongation, would be greater than the maximum ordinate which would be a function of the polar distance. One-half the major axis of the ellipse represents the azimuth at elongation, and one-half the minor axis represents the polar distance. The intersection of the axes is, of course, the position of the pole.

*Professor of Mining Engineering, West Virginia University, Morgantown, W. Va.

If observations are to be made for only a few hours we would have only a portion of the ellipse and it would be almost impossible to accurately locate the position of the pole. If the result of the plotting were a circle its center could be accurately located if we had two or more points on its circumference and knew its radius. With three or more points the radius need not be known.

In this problem, however, the radius is always known and assists somewhat in securing accuracy. Fortunately, this circle can readily be plotted by means of the theorem regarding the "auxiliary circle" to an ellipse, which may be stated thus: An ellipse may be transformed into a circle having for its diameter the major axis of the ellipse by multiplying all ordinates by the ratio of the major axis to the minor axis.

METHOD OF OBSERVATION

Have the transit in perfect adjustment. Set up over a permanent station, set the plates at zero and sight on a reference point about 300 or 400 ft. distant. This sight is preferably taken without plunging the telescope. Clamp the lower motion and loosening the upper motion sight the instrument on Polaris. Read and record the altitude of the star and the amount and direction of the angle turned off.

Immediately loosen upper motion, plunge and swing-

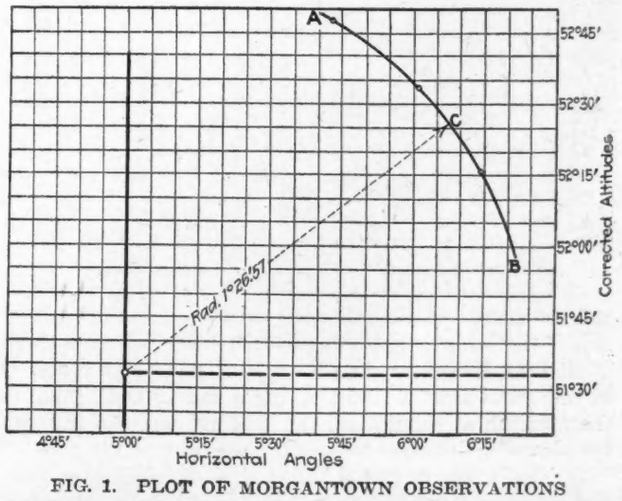


FIG. 1. PLOT OF MORGANTOWN OBSERVATIONS

Had an angle of 5 deg. been turned from the reference line to the right the telescope of the transit would have been in the plane of the meridian. Hence the reference line was No. 5W.

ing the instrument through azimuth, take another set of readings to compensate for any possible errors of adjustment. The average of these readings, first correcting the second plate reading by 180°, will give the average altitude and angle between the reference line and Polaris for that set.

In about an hour take a second set of readings and in another hour, a third set. The time interval is of no importance except to give a considerable distance between the points on the circle. Two sets of readings are sufficient, but additional sets serve as a check.

In order to correct the altitude readings so as to throw the plotted positions of Polaris on a circle rather than on an ellipse it is necessary to multiply the altitudes by the ratio of the azimuth at elongation to the polar distance. A solar ephemeris for the current year such as is published for free distribution by the manufacturers of surveying instruments, will give the declination of Polaris for any time of the year.

Or, the "Ephemeris of the Sun and Polaris," which is published annually by the Department of the Interior, can be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents. The polar distance is 90 deg. — declination. If an Ephemeris is not at hand the declination of Polaris may be closely approximated, the average declination for 1921 being 88° 53.11′ and increasing annually at the rate of 0.27′.

Calculation Depends on Observer's Latitude

The latitude should be known rather closely, within 5 or 10 min., if possible, as it is necessary to calculate the azimuth of Polaris at elongation by means of the formula:

$$\text{Sin azimuth} = \frac{\text{sin polar distance}}{\text{cos latitude}}$$

An assumed set of notes for Nov. 10, 1921, with the calculations indicated, will show the ease with which the meridian may be obtained.

Observations taken at Morgantown, W. Va. (lat. 39° 38′ N.), Nov. 10, 1921:

Declination of Polaris (from Ephemeris)	88°	53.33′
Polar distance (90 deg. — declination)	1°	06.67′
Azimuth at elongation $\left(\sin Az = \frac{\text{sin polar dist.}}{\text{cos latitude}}\right)$	1°	26.57′
Ratio of azimuth to polar distance (1° 26.57′ : ° 06.67′)		1.30

Time	Hor. Angle Turned to Right to Polaris	Altitude Polaris	Average Hor. Angle	Average Altitude	Corrected Alt. (Alt. × 1.30)
7.16 p.m.	6° 15′	40° 11′	6° 14.5′	40° 12′	52° 15.5′
7.21	186° 14′	40° 13′			
8.15	6° 02′	40° 24.5′	6° 01′	40° 25.5	52° 33′
8.19	186° 00′	40° 26.5′			
9.18	5° 44′	40° 36′	5° 43′	40° 36.5′	52° 47.5′
9.22	185° 42′	40° 37′			

The average horizontal angles are plotted as abscissas and the corrected altitudes as ordinates on cross-section paper, the scale being chosen so that 1 deg. is represented by at least 3 or 4 in., as shown in Fig. 1. The center *O* of the arc *A B* of a circle having a radius *O C*, equal to the azimuth at elongation, the said arc passing through the plotted points, represents the position of the pole.

In Fig. 1, the center *O* being at 5° 00′ indicates that, had an angle of only 5° 00′ been turned from the reference line to the right, the telescope of the transit would have been in the plane of the meridian; hence the bearing of the reference line is N 5° 00′ W in this instance.

The position of the pole corresponds to an altitude reading of 51° 33′. Dividing this by 1.30 gives 39° 39′ for the altitude of the pole as observed through the instrument.

TABLE

Mean Refraction Corrections to Be Applied to Observed Altitudes

Altitude	Refraction
20°	2′ 39″
22°	2′ 23″
24°	2′ 10″
26°	1′ 59″
28°	1′ 49″
30°	1′ 41″
35°	1′ 23″
40°	1′ 09″
45°	0′ 58″
50°	0′ 49″
55°	0′ 40″
60°	0′ 34″

Applying the refraction correction for this altitude, about 1′, we get 39° 38′ as the true altitude of the pole. Inasmuch as the altitude of the pole is the latitude of the place of observation the latitude 39° 38′ is found to check with our known latitude.

If the exact latitude was not known when the azimuth at elongation was computed it can be found by this method, and should not be in error more than 1 or 2 min. if the assumed latitude was within 10 or 15 min. of the correct amount.

Stated briefly the rule is: To find the latitude of a place of observation, divide the corrected altitude reading of the pole, as obtained from the plot, by the ratio originally used to obtain the corrected altitude; subtract the refraction correction for proper altitude, as shown in the above table; the result will be the true latitude of the place of observation.

Dr. A. R. Powell, physical organic chemist of the U. S. Bureau of Mines, is continuing his work on sulphur in coal and coke. Large-scale oven tests, supplementing laboratory work to determine the action of hydrogen on the sulphur in coke and its possible commercial application to coke desulphurization, have been completed. These tests showed much lower desulphurization than the laboratory tests, but enough to justify further work in the laboratory. The results of the work on sulphur in coal and coke have been brought out in a series of papers by Dr. Powell.

To aid in the conservation of fuels, research into their use in heating and ventilating plants is being conducted at the Pittsburgh Experiment Station of the U. S. Bureau of Mines under a co-operative agreement with the American Society of Heating and Ventilating Engineers. Work on the following problems is now in progress under this agreement: Standardization of the measurement of dust particles suspended in air; study of combustion in domestic heating boilers; checking results obtained in the application of the testing code covering house-heating boilers; the effects on health of temperature, humidity, and motion of air in buildings and plants.

J. D. Davis, chemist, U. S. Bureau of Mines, has investigated methods of sampling and analysis of foreign governments as applied to American export coals. Mr. Davis and Palmer B. Place, junior chemist, are determining the reaction heat of coal during destructive distillation. Representative American coals of all ranks are being studied; the total heat of reaction and the temperatures at which heat effects are manifest are being determined. Mr. Davis, in co-operation with the carbonization committee of the American Gas Association, is investigating low-temperature carbonization methods, particularly as applied to problems of the gas industry.

Co-operative sampling of coal mines has been done in the State of Virginia, the samples being taken by the State geologist under the U. S. Bureau of Mines' regulations and analyzed by the bureau's chemists.

Steel for Strength, Asphalt for Dryness, Asbestos for Life Make Light and Lasting Coat for Roof or Walls

Annealed Steel Freed of Impurities Protected Against Gases and Moisture by Asphalt, Any Defects of Which, When Traveled On, Being Corrected by a Coat of Asbestos and Waterproofing

MANAGERS and superintendents are harassed by continued calls on their time to supervise repairs and meet emergencies, so that too often they do not have any opportunity to give their attention to the weightier matters of production and lowered cost. If the preliminary work be rightly performed the plant cares for itself and the only variables which need supervision are those of the underground, of preparation and of personnel management. It is remarkable how many men in undertaking construction overlook the harvest of misfortune, labor, anxiety and uncertainty they lay up for themselves by deliberately choosing perishable material.

Always Many Reasons for Using Makeshifts

There are two periods in operation which cover almost all the years of experience: Times when material and labor are hard to obtain and production is so pressing that repairs are delayed and overlooked, and times when there is no chance to operate at a profit and when, though materials and labor are plentiful, expenditures for upkeep are forbidden or must be kept down to a minimum. It is always either shining or raining and, as the well-known story goes, it is in either event a poor time to mend the roof. If the roof is built right or the superintendent boldly decides that, rain or shine financially, it must be renewed permanently, a grist of troubles which may later overtax the management may be avoided.

Certain stable, permanent, fixed supplies and equipment about a mine undergo but little change during long periods of years. Unfortunately many coal companies believe that they cannot afford to make an initial investment in these materials such as would enable them to buy a product the cost of which over years is much less than that of a cheaper substitute. In the long run the investment in the cheaper product is the greater. Many companies, however, do not hesitate in this regard. Where permanence is desired they buy a permanent product, even though the initial cost be large as compared with one possessing less lasting qualities.

Protective Coating Is Itself Protected

The H. H. Robertson Co., of Pittsburgh, Pa., manufactures a protected material known by its trade name as the Robertson process metal, which in its various forms is used widely for industrial-building construction. It finds application in place of sheet-metal coverings, particularly those that are galvanized. The first cost of this product is high—several times that of the ordinary unprotected material—but its life is much longer. Its installation cost is no greater than that of the all-metal product and its maintenance expense is almost negligible. A building when once completed and covered with this product is permanently attractive, substantial and requires no outlay for upkeep.

The metal base of this product is an annealed steel sheet the surfaces of which have been freed from impurities, thus insuring a perfect bond with the covering material. The metal is protected from gas and moisture by a coating of asphalt, which in turn is protected from abrasion and held in place by an asbestos-felt blanket. This covering is guarded from destructive agents by a tough and elastic waterproof coating that will not crack or chip. The asbestos is drawn over the edges, which also receive the protection of both the asphalt and the waterproofing compound.

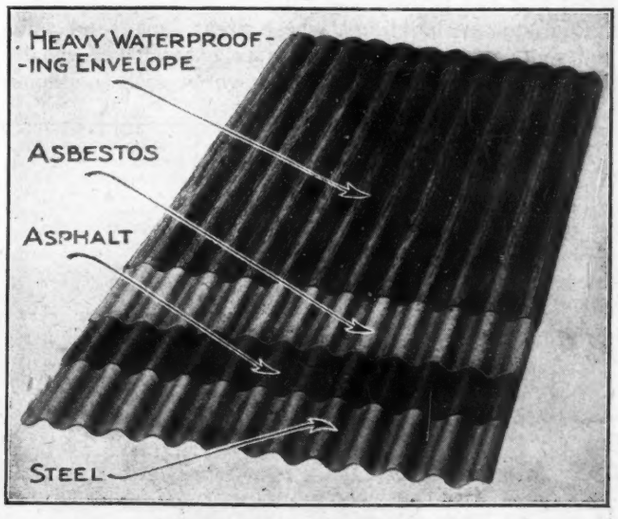
This building material is made in a number of standard forms and sizes suitable for almost any kind of construction. With a wide assortment to choose from, a structure may be erected economically and at the same time embody permanence. In addition to roofing and siding sheets, accessories in the form of ridge caps, flashings, louvres, ventilators and skylights are furnished.

Molded Into Many Suitable Building Shapes

Roofing and siding sheets are made in several forms. Among these are the corrugated, the beaded and the mansard sheet for roofing and siding, while a clapboard sheet is furnished for siding only. A flat sheet finds application as sheathing. The joints in this case may be covered with wood battens, giving a panel effect. Such sheets may be used for any purpose where a flat surface is required, as, for instance, in partition walls, fire doors and the like.

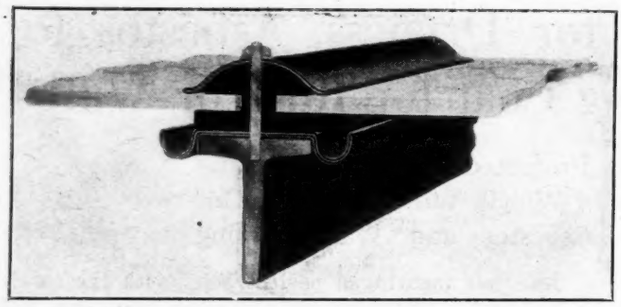
For roof run-off, gutters and downspouts of this same material serve for a long time where other more expensive material would fail. Assembly of the various types and sizes of sheets is accomplished by means of suitable fastenings, made specially for the purpose.

The corrosive action of acid-bearing gases on metal



ASBESTOS-PROTECTED METAL

On a base of annealed sheet steel is placed a coating of asphalt which protects the metal against dampness. But the asphalt would be scratched or scraped off in use, so a coat of asbestos is put on it which has the necessary enduring qualities. This in turn is covered by an elastic waterproof coating.



METHOD OF ATTACHING GLASS TO ROOF
Asbestos-protected metal is used for the moisture-catching troughs and for the clamp by which the glass is held in place.

roofing, such as that covering a boiler plant, compels periodic and costly replacements. Robertson process metal with its impervious covering will withstand this corrosive action indefinitely. In addition to being less expensive than clay roofing products, it has the advantage of weighing less and thus a lighter roof structure will support it. Where a fireproof material is needed this metal may be used to advantage.

Pays to Avoid the Annual Repair Bill

Coal operations with a reserve large enough to guarantee production over a period of several years should be provided with structures upon which constant repairs and replacements are unnecessary. Such difficulties cause needless worry, mean additional off-shift work and sometimes halt operations. This material is well adapted to the covering of tipples and breakers. Many of the large coal companies have used it for this purpose throughout long periods, and continue its use in their new structures. Conveyor shelters covered with this metal give long service. Coal dust when accompanied by moisture has a corrosive action on galvanized iron which if not adequately combated or counteracted necessitates frequent replacements.

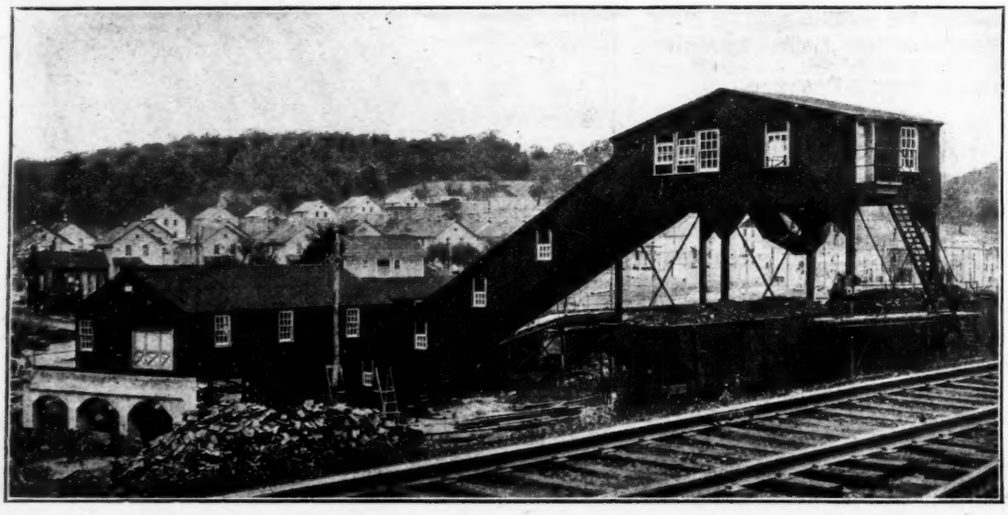
Buildings adjacent to beehive coke ovens must be able to withstand the action of the gases given off in the coking process or their life will be short. Protected metal has been tested by chemical manufacturers in places where extremely destructive gases are encountered and has proved itself highly resistant thereto.

Coal storage buildings, whose great expanse of walls and roofs make their maintenance excessive if repairs are periodically needed, may be covered with this material, after which all appreciable upkeep cost ceases for a long time. Beaded sheets are giving excellent satisfaction for shaft houses. In blacksmith shops the flat sheets may well be used in the construction of flues. In fact each individual plant frequently discovers uses for this material adapted to its own specific requirements.

One of the primary requisites of a supply house or shop is that it shall possess lasting qualities. To obtain a fair degree of permanence the general practice in the past has been to resort to a heavy wall construction of brick, concrete or other massive material, whereas equal permanence may be obtained by using this metal over a light steel frame. The lighting problem is easily solved by employing special skylights in conjunction with any of the ordinary types of windows in the walls. After the foundation has been laid and the materials are on the ground such a building can be completed before the side walls of a corresponding brick structure could be erected. The cost of the lighter construction will be appreciably less than that of the heavier. Furthermore, when an alteration in a shop structure is desirable, as, for instance, the placing of a window or a door at some particular point, or the addition of an annex, a shop covered with protected metal may be easily changed to suit the requirements without destroying or wasting the material removed.

Each of Three Layers Has Its Purpose

The three layers of protecting material placed over the annealed steel add much to the desirability of the finished product, each covering being used for a particular purpose. The claims made by the manufacturer for this building material include: (1) The impervious coatings protect the metal from rust, corrosion and general deterioration arising from exposure to the weather, smoke or gases; (2) the metal is not affected by severe acid or alkali fumes, condensation, galvanic action or by any metal-destroying agent to the attacks of which industrial buildings are liable; (3) the sheet, because of the nature of its protective coverings, possesses marked insulating qualities; (4) the outside coating, composed of mineral pigments, imparts a permanent color which possesses the economic advantage of rendering painting and other decorative work entirely unnecessary; (5) the sheets are light in weight, strong and easy to install; (6) they present an attractive appearance and reduce the construction costs of buildings of a permanent character.



Commodore Tipple

This plant, belonging to the Clearfield Bituminous Coal Corporation, of Clearfield, Pa., is covered on both sides and roof with asbestos-protected metal.

Correct Shape for Bits of Coal Cutters

By C. B. Officer*
Chicago, Ill.

ONE of the most important considerations in the successful and economical operation of chain coal-cutting machinery is the proper shaping of the cutter bits used in the machine, for they are the parts which come into contact with the coal. It naturally follows that anything that can be done to increase the actual cutting ability of these bits will increase production and reduce the cost of operation.

In discussing the shape of bit that should be used, the same terminology will be adopted in regard to the various sections of a cutter bit that Mr. Taylor adopted in his various reports on the results obtained by tools of various shapes in metal cutting. Many of the axioms which Mr. Taylor developed for metal-cutting tools are equally applicable to chain-machine cutter bits. Careful consideration given to the work required of machine tools in cutting metal and to the work imposed on chain-machine bits in cutting coal will soon convince anyone that there is a close analogy between them.

In the illustration are shown both pick-point and chisel-cutter bits. The various angles as indicated on the drawings are marked *A*, *B*, and *C*. Angle *A* is known as the clearance angle, angle *B* as the back-slope angle, and angle *C* as the side-slope angle. Each of these angles has an entirely different and separate function. Unless the cutter bits are made with the proper angle in each one of these three places, the proper cutting results cannot be obtained.

Twice the Angle Given Metal-Cutting Tool

The function of a proper clearance angle is to prevent the back, or heel, of the bit from rubbing against the coal face, for when this happens, more power is required to drag the bit and greater effort is required to hold the cutter bits up against the coal. Both of these factors mean an increase in the power required to make a cut. From experience in the field it has been found that the clearance angle of the chain-machine cutter bits must be about double that given a metal-cutting tool.

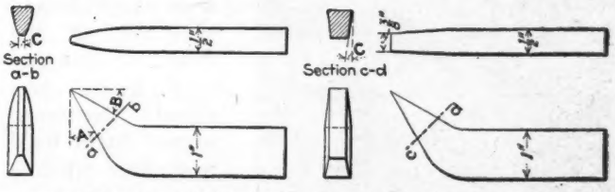
This larger angle is needed on a chain-machine bit because it is pulled along the face of the coal, the coal being cut as the metal in a planer, whereas with a lathe tool the metal that is being cut is rotated and its circular path gives more clearance between the back of the tool and the piece being cut.

Moreover, with a chain-machine bit, because of the nature of the work imposed upon it, it is necessary to continue running the bit after it has become slightly dull, whereas on a metal-cutting machine it is possible to replace the cutting tool as soon as it becomes slightly worn. If the chain-machine bit is used after it is slightly worn the bit will drag on the coal unless more clearance angle is given it than is provided the metal-cutting bit. From actual tests it has been found that both pick-point and chisel bits give best results when a clearance angle of about 30 deg. is provided.

Because of the structural difference between coal and metal, it is necessary to have the back-slope angle on the bit made greater than the same angle on metal-cutting tools if the chain-machine bit is to have a cutting action. If this angle is made flat, the cutter bits will not get in back of the coal, and produce a cutting action. A blunt-nosed tool crushes rather than tears, or cuts, the coal. Less power is required, of course, to cut than to crush the coal. If too sharp an angle be given to this back slope, it gives too weak a section across the nose or point of the tool, and the tool will not have sufficient strength to do the work. In order, then, to determine the proper back-slope angle, two factors have to be considered: the digging-in or cutting effect as balanced against the weakening effect on the bit arising from too great a back-slope angle. In balancing these two factors so as to produce the most satisfactory bit it has been found from many tests that an angle of approximately 30 deg. will give the most satisfactory service.

Side-Sloped so as to Avoid Wedging

The side-slope angle still remains for consideration. The correct adjustment of this angle is evident when it is considered that each bit in the cutter chain, every time it is pulled along the face of the work, makes a new cut in the coal varying in depth from ¼ to ½ in., depending upon the type of machine and kind of coal cut. Unless clearance be given along the side of the bit on its cutting portion, the sides of the bit will drag in the cut made and will produce a wedging rather than a cutting action. More power would have to be applied to the machine to drag the chain through the coal, and also more power applied to the mechanism for holding the cutter bar up against its work. This side clearance is one of the most important factors in the shaping of proper bits, and where hand or power forging is used, unless considerably more time than usual is taken to sharpen each bit, this side clearance cannot be obtained. Because of the importance of this side clearance and the great difference between the cutting ability and the power required between bits of proper and improper side clearance, greater attention should be given in the blacksmith shop in the resharpening process to give the proper side clearance to all bits. The proper angle is 7 deg. for chisel bits and 16 deg. for pick-point bits.



PICK AND CHISEL-POINT BITS FOR COAL CUTTERS

The clearance angle, *A*, should be so large that the bit will not drag along the coal, which does not retreat from the bit as does a piece of metal in a lathe. The back-slope angle, *B*, must be so large that the coal is cut and not crushed. The angles *A* and *B* must not be so large that the cross sections *ab* and *cd* are insufficient to meet the strain. The side-clearance angle, *C*, must be large enough to prevent wedging and small enough not to weaken the tool.

Tests made with machines having bits such as are generally found around coal mines and the same machines having bits which had been formed on the new Sullivan sharpening machine† showed that about 25 per cent more electric power was consumed when machines supplied with the former were used and the same number of places was cut. There also was a reduction of about 50 per cent in the force required to hold the machine or cutter bar up against its work. In the tests it was determined that a set of bits properly shaped with the Sullivan cutter-bit sharpener would cut a much greater number of square feet before having to be renewed than would a set of the bits such as is found at many mines.

*Mining engineer.

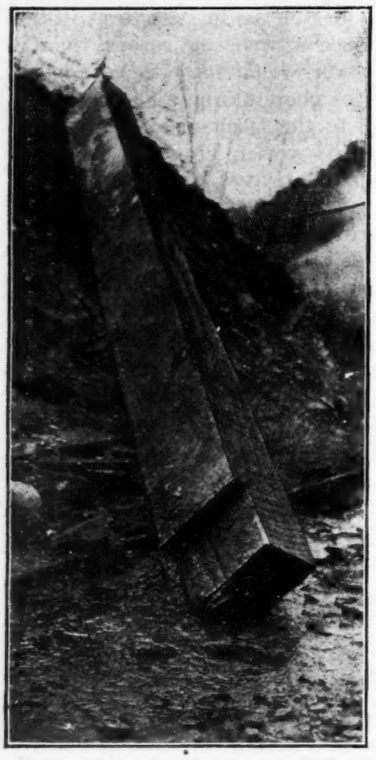
†Described in Coal Age, Dec. 1, 1921.

Another Non-Gaseous Mine Explodes, Killing Two Men on the Surface

By George Edwards
Pikeville, Ky.

AT ABOUT 12.30 p.m. on Oct. 17, 1921, the mine of the Bailey-Pond Creek Coal Co., on Pond Creek on the Kentucky side of Tug River near Williamson, W. Va., was the scene of an explosion somewhat out of the ordinary. This is a new operation developing the Pond Creek bed of coal, which has never been classified as gassy. Neither was dust from this coal ever considered as being particularly inflammable. The main entry of the mine at the time of the explosion had been driven only 263 ft. The first right entry had just been turned. The coal at this point is less than 4 ft. thick and the roof is of unusual strength. In this operation all coal was shot off the solid, the intention being to install electrical undercutters later.

Owing to the excellent natural drainage the working faces were quite dry. The practices followed at this mine were about the same as those used in any mine where solid shooting is the rule. Heavy charges of black powder were tamped with slack, and comparatively large quantities of this explosive were stored near the operation. The coal was shot and the smoke expelled, however, during the noon hour and again in the evening when all men were out of the mine. On the day and hour previously mentioned several holes had been fired when a blow-out shot occurred. This apparently ignited some of the smoke or inflammable gases resulting from previous shots, which in turn set off a quantity of powder stored in the mine, flame from which evidently found much coal dust in suspension, with the fan furnishing about 8,000 cu.ft. of air per minute. Conditions were thus favorable to the heavy explosion that followed. The fact that all men were out of the mine accounts for only two being killed and one seriously injured. These unfortunates happened to be near the opening and in the direct path of the explosion.



BIG TIMBER BLOWN CLEAR OVER HIGH HILL

This 10 x 12 in. x 12 ft. timber hurtled through the air a distance of several hunded feet. The drift timbers of both openings were scattered over the hillside.

Although set in concrete, the fan was crumpled into a mass of junk and thrown across a ravine. The 10 x 12-in. timbers that had formed the roof supports of both the mine openings were blown out and scattered over the opposite hillside. One was hurled completely over the opposite hill and finally came to rest several hundred feet from its original position.

RAVINE AFTER THE EXPLOSION

Fan is to be seen in center of illustration and timber litters the whole foreground. Not for nothing is the entrance to the U. S. Bureau of Mines experimental mine made of reinforced concrete.

Some important lessons may be learned from this occurrence, and these should be absorbed by miners and operators everywhere. Those responsible for the development of this property were no more careless or less familiar with safe mining practice than other well-informed operators in the same field. The fact remains that shooting off the solid is dangerous anywhere. Accidents may be expected just as long as practices inherently perilous are adopted.

Rotary Dump for Railroad Cars for Use in Industrial Plants and Storage Yards

HIGH wages and labor scarcity have been responsible for such an increase in the cost of unloading bulk material from open-top cars that the time appeared ripe for the introduction of a dumping device of moderate cost and small power requirements. Accordingly the Robins-Scherzer dump, adapted to small plants where moderate quantities of material are handled and only a small amount of power is available, has been developed and placed on the market.

This machine is built in two sizes; the smaller will discharge cars up to 90 tons and the larger up to 120 tons capacity at the rate of twenty to thirty per hour. The general appearance of this machine may be seen in the accompanying illustration, which shows the device in the act of dumping a load of coal into a track hopper. The 90-ton machine will accommodate cars from 8 ft. to 10 ft. 4 in. in width and from 6 ft. to 11 ft. 2 in. in height above the rail.

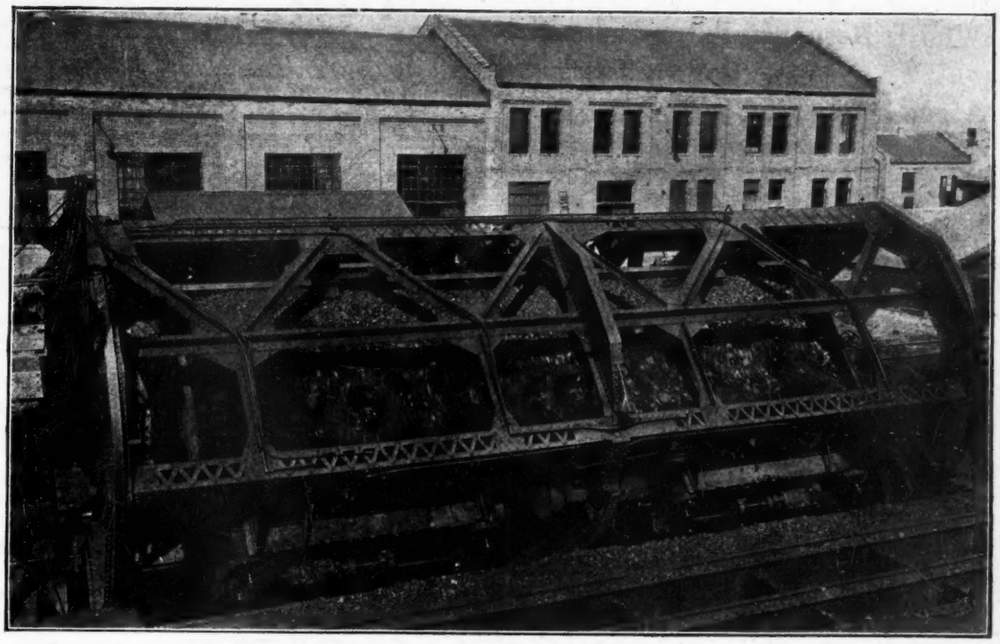
When empty the dumper is so balanced that its center of gravity coincides with its center of rotation. In dumping, the framework, which is 50 ft. long and supports a section of track above a hopper, is rotated through an angle of 150 deg. The framework barrel is supported by a circular belt at either end resting upon wheels carried on equalizing castings mounted on steel supports placed upon the foundation.

The dump is driven by a 40-hp. motor through a gear quadrant attached to the center or middle belt. A lock is provided, of course, to hold the framework in proper position when cars are either entering or leaving it, this device being interlocked with the motor control in such a way as to insure that all operations shall be performed in proper sequence.

When the car lies on its side within the dump it is supported upon two platforms each 6 x 12 ft. in area which are moved into position against the side of the car by two 7½-hp. motors operated from one controller. The holders gripping the top of the car consist of two

Revolving Dump

Such dumps are not useful solely for piers. They are being adopted at many industrial plants, for there is no easier way of unloading a railroad car. The large size will dump 120-ton cars at the rate of twenty to thirty per hour. The question arises whether this method of dumping could not be used with stock piles, the coal thus dumped being transferred by belt to any place desired.



hooks upon each side. These are brought down by power through equalizing gearing so that they all come to place with the same pressure. These hooks are actuated by a 12-hp. motor.

The chief characteristics of this machine as compared with other devices of a similar nature are low cost, gentle handling of rolling stock and small power consumption. It has been developed and is being marketed by the Robins Conveying Belt Co., of New York and Chicago.

Advice as to the Lubrication of the Ball Bearings of Mine-Locomotive Motors

BY E. ASHWORTH*

PROPER lubrication is an important factor in the successful operation and life of ball bearings. To keep such bearings in condition they must be protected against dirt and grit, must be afforded the proper quantity and quality of grease or oil, and must be cleaned, with their housings also, at regular periods.

Provision for admitting the lubricant to the ball bearings usually is in the form of a hole tapped in the bearing cap or a pipe extending from the bearing cap to the top of the motor. When mining motors leave the manufacturer, suitable plugs or caps are provided to keep out sand and dirt. As a rule, however, the caps or plugs are missing after the motors have been in service a short time. There are several reasons for their being in that condition. They may be summarized as follows: Too frequent oiling, no conception of the damage resulting and carelessness on the part of the operator.

Manufacturers of ball bearings issue specifications setting forth the kind of lubricant needed for a satisfactory operation of their bearings under various conditions of service. It is probable that many operators do not have these specifications. As, moreover, the specifications have reference to bearings employed in many ways, it is possible that operators who have them are not sure which is suited to their particular need.

*Motor engineering department, Westinghouse Electric & Manufacturing Co.

The following specifications of grease and oil, therefore, are recommended by the writer as suitable for mining locomotive-motor ball bearings:

Grease	Maximum
Free Acid (calculated as oleic acid)	0.10 per cent
Free Alkali (calculated as sodium hydroxide)	0.10 per cent
Free Lime (calculated as calcium oxide)	0.10 per cent
Sulphur	0.03 per cent
Resin	none
Salt	none
Neutral Saponifiable Oil	1.00 per cent
Abrasive particles (sand, etc.)	none
Melting point about	180 deg.

Grease should have no tendency to become sticky. It should not contain graphite or fillers of any kind.

Heavy Ball-Bearing Oil	
Free Acid	0.10 per cent
Free Alkali	0.10 per cent
Sulphur	0.03 per cent
Ash	trace
Resin	none
Salt	none
Heat Test (15 min. at flash point) darkening, but no sediment	slight

Lubricant should be pure mineral oil and have no tendency to gum or become sticky.

	Minimum deg. F.
Flash point (Cleveland Open Cup)	300
Fire Test	350
Viscosity (Saybolt) from 300 to 500 secs. at	100

Though both grease and oil have given satisfactory service in mining-motor ball bearings it is my opinion that grease is preferable, as it is difficult to keep oil in the bearing. If oil is used the bearing should be filled about up to the center of the lowest ball. If grease is used the housing should be from one-half to three-quarters filled. When oil is used the oiling periods should be about two to three weeks apart. When using grease the bearings should be oiled every four to six weeks.

In applying the lubricant care should be taken to wipe loose dirt and sand from around the oil openings. The lubricant should be stored in closed cans and it is preferable to use a closed tank type grease or oil gun for applying the lubricant to the bearing. If a tank-type grease or oil gun is used, the hose can be arranged with a threaded coupling to fit the oil pipe or hole, thus providing quick and sure application.

The bearings and housings should be cleaned at regular intervals. Every six months is recommended. The bearings and housings should be thoroughly washed with kerosene to remove the old lubricant and then with a good light bodied oil to remove all kerosene remaining in the bearing.

Who Is Responsible for Industrial Waste?

BY R. DAWSON HALL*

AFTER a rapid survey lasting from Feb. 7 to June 3 the Committee on Elimination of the Wastes in Industry of the American Engineering Societies has produced a remarkable and valuable report entitled "Waste in Industry," which has been published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

So mammoth an undertaking could not but result in some dissatisfaction. Complaint may be made of the inadequacy of the investigation; more might be said as to the premises on which it is based, and some complaint made on the fact that it cannot be made truly an engineering production in that it often is a study of imponderables whereas the study of the engineer is supposed to be regarding things which can be accurately weighed and measured. Others again will say it should not have been attempted, especially by engineers. But say what may be said, it is a much fairer statement than could have been expected had it been left to those not trained to weigh matters without bias.

Seeing that engineers are largely responsible for the management of industry it is remarkable that this 387-page report puts the main burden for waste on their own mishandling of industry. We cannot conceive any other body of men who would prepare such an indictment of themselves and of their employers, with whom they have always had the most pleasing of relations. The engineer, it would seem, cannot be regarded henceforth as an upright man, but as one who leans backward. There are only three faults in industry, "mine, thine and the public's." What faults are neither provable to be thine nor the public's are zealously accepted for management. "Management," say these morbid self-analysts, "is the art and science of preparing, organizing and directing human effort applied to control the forces and to utilize the materials of nature for the benefit of man."

IS LABOR CLAY IN HANDS OF A POTTER?

So written the rest of the world is irresponsible clay in the potter's hands. No wonder more than 50 per cent of the responsibility is traced to management. The clay can surely do no wrong. With such a definition, the management is clearly responsible for 100 per cent of the lack of production. It has failed if it cannot control the forces of manpower and those of nature, those rated as human as well as those designated as divine. However, the report lays only 50 per cent against management, 25 per cent against labor and 25 per cent against the public.

These last figures look grossly unscientific. In the detailed report the figures are to two places of decimals; one wonders that they were not carried out as far as is *pi* by the mathematicians. Thus it is said that the men's clothing industry has an inefficiency of 48.33 per cent traceable (assayable is the specious expression) to bad management, 10.50 per cent ascribable to labor and 4.95 per cent chargeable to "outside contracts" (the public, trade relationships and other factors). The total in inefficiency is 63.78 per cent.

In estimating the faults of management it would seem that all faults of judgment and all wilful wastes are charged up. In considering faults of labor, premeditated faults are alone considered. The will to do wrong is the only charge which is assessed against labor, whereas management is assessed with all its shortcomings The ignorant workman is excused for his ignorance, however foolish; the misguided manager or the manager believed to be misguided is rated as a grievous offender because he is not 100 per cent shrewd in managing affairs in the interest not of himself but of the public.

Still there remains a value in this book, especially for the employer. If he would go to the confessional well prepared and duly humbled, here is the book for his introspectional fault finding. It is clearly his book. He should read it. Unfortunately it is not an "auricular confession." The public and labor may read it and from it may deduce, and has already deduced, that the manager is the worst of sinners, for has he not so declared himself?

He has in the definition of management arrogated to himself the possession of all the duties of right intellectual judgment as concerning the conduct of business for the benefit of the other two partners in his industry—in his case labor and the public. So, having elected to be the brains of industry, he is held for his brains as well as his morals, and he shows up twice as lacking as either one of his two partners.

The plumber or his union is to blame if he, being idle, will not avoid idleness by engaging in some other work. The miner is to blame if he stays at a slow-working plant or neglects the opening afforded by agriculture. The stenographer is to blame if when he starts work he does not contrive by industry to acquire his art immediately—we say "immediately" because the employer is not allowed any time for learning the art of managing in the particular line he may be newly attempting. The report in taking the other view is unfair. All workmen are to blame if they do not fit themselves and accept work in kindred lines when it is offered.

"In the best years," says the report, "even the phenomenal years of 1917 and 1918, at the climax of war-time industrial activities, when plants were working to capacity and when unemployment reached its lowest point in twenty years, there was a margin of unemployment amounting to more than a million men. This margin is fairly permanent; seemingly one or more men out of every forty are always out of work."

There was no report from the coal industry. Men's clothing, building, printing, boot and shoe manufacturing, metal trades and textile manufacturing are the only industries considered.

However, we who have impatiently listened to Herbert Hoover, who was president of the Engineering Societies when this activity was started, and heard him declare that the bituminous-coal industry functions worse than any other, I fear will be evil-minded enough to rejoice when we read in the report thus secured that the clothing worker is idle about 31 per cent of the year, the shoemaker about 35 per cent and the building-trade workman about 37 per cent, whereas the bituminous-coal miners were idle only 93 days in a possible 306 days, or 30 per cent. Even in 1919—a banner year—the brick, chemical and glass industries were idle 15, 16 and 13 per cent of full time, respectively.

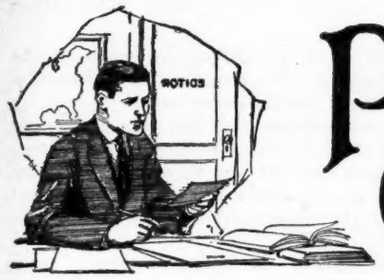
SAMPLES OF WILLFUL INEFFICIENCY OF LABOR

The committee in making its report faced an almost hopeless task and it is feared will satisfy few. With mine workers leaving the mine at all hours of the day, with bricklayers laying 350 to 400 brick per day where they formerly laid 1,500, there are signs that the committee has been too favorable to labor. In the instance of the bricklayer there is an inefficiency of 77 per cent to add to that already existing when 1,500 bricks were laid, and to be further added to by considering the greater help furnished the bricklayer now than formerly. To this should be added loss owing to jurisdictional strikes. Doubtless a deduction should be made for the shorter time now worked.

Yet the responsibility in the building industry assayed against labor in this report is only 11.30! This shows how unreliable are the calculations that the book contains. It is, however, wonderfully illuminating and intensely interesting as to conditions in the industries, and it fails only in its attempt to evaluate numerically the causes of waste. The matter is boiled down to its essence and yet there is no attempt to do this at the expense of style. The book consequently is free from the two opposing faults which too often destroy the value of such publications—prolixity and excessive condensation.

STATISTICS COMPILED BY THE ENGINEERING AGENCY, a technical employment bureau operating all over the United States for nearly thirty years past, show that the number of inquiries for technical help in manufacturing, construction, industrial and commercial work steadily decreased from February, 1920, to June, 1921, and since the low month of June have shown an increase. In other words the average minimum was reached in June and a slow but comparatively steady increase has been in evidence since then.

*Editor, *Coal Age*.



Problems of Operating Men

Edited by James T. Beard

Success in Mining Coal Depends on the Right Choice of Equipment

Change from Pick to Machine Mining Requires Improved Equipment —Careful Study of Conditions Needful to Insure Success—Type of Coal-Cutting Machines Important Factor in Loading Clean Coal

REFERRING to the letter of Willam Crooks, Clinton, Ala., *Coal Age*, Nov. 17, p. 806, what seems to me of the most importance is that portion where he compares machine mining with solid shooting. I am inclined to favor his opinion regarding the relative cost of these two methods.

Studying closely the varying conditions that exist in many different mines, all working the same seam of coal, perhaps some twenty or thirty miles apart and located on the same line of railroad, we find that some of these mines were opened and worked for a time as pick mines. Then, after a few years they were converted into machine mines at a considerable outlay.

Improved Equipment Required

From the start of machine mining, the mine which had always been noted for steady work will generally be found to drop into the irregular class. Why? Because the old-style tipple arrangement was inadequate and could not compete with our great modern tipples, equipped with picking tables, loading booms and other means of screening and selecting the coal.

When the newly mined machine coal arrives at the dump it goes over the screens, coal, slate and binders together, and is loaded and shipped. Arriving at its destination, it is no wonder that a great squeal is sent back to the mine for shipping such stuff. The result is orders are canceled and the contract broken, because it called for coal and not dirt.

Study Conditions to Determine Best Type of Machine

Without a question there is a cause for this condition and some one in authority is much at fault. The officials in charge failed to study the actual conditions of the seam they were operating and, in addition, they failed to study and provide the necessary equipment for handling and preparing for market the output where the coal is undercut by machines.

In that twenty- or thirty-mile stretch, previously mentioned, the same seam may have changed, from a very clean coal free from sulphur and binders, to a seam containing both of these impurities. In that case, if machine mining is introduced it is essential to study carefully the difference between a chain machine and one of the puncher type of coal cutters.

As previously stated, a mine may be able to run practically full time, under pick mining, and, after the introduction of machine mining, the results may prove very unsatisfactory. Selecting a suitable machine requires a person who has not only had the necessary experience with machines, but understands the conditions and is fully aware that shipping clean coal will multiply orders and keep the mine running full time.

The term "solid shooting" has no application to many of our mines. A more common term is "pick-mined coal," which has reference to where the coal is properly mined, or is undercut about as deep as the height of the seam. Where good judgment is used in placing the shot and gaging the amount of powder required to do the work and not unduly break the coal the miner has a better chance to clean his coal while loading it.

Advantage of Coal Puncher

Next to the hand pick comes the puncher machine, which has one particular advantage over the chain undercutting machine, in that it can be easily made to shear the coal in the center of a room or place, or on either side, whichever appears most suitable for obtaining clean coal.

The shooting of the coal, in many of our mines, is the one thing that lessens the production of lump coal. The practice of shooting off the solid both in rooms and headings tends to smash the coal, breaking it up and mixing it with the sulphur and binders, which would otherwise be picked out by the miner and thrown back into the gob when loading his cars.

In considering the facts that are essential to successful machine mining, I would decide to underpunch and shear the coal, which calls for a machine of the puncher type in preference to undercutting chain machines, in the mining of bituminous coal.

Shooting off the solid, either in room or pillar work, in mines where the coal is impregnated with binders and sulphur, is not conducive to obtaining clean coal. Then to produce clean coal it is necessary to establish a suitable system. In pick mining, the coal must be undercut before shooting and larger coal is produced. The miner has finished the hardest part of his work when the undercutting is done. He then has more time to clean the coal while loading.

In parts of Europe, the seams are much mixed with binders and, in order to avoid dirt being loaded with the coal, the management generally adopts this method of mining where the coal is undercut before it is blasted. Solid shooting, indeed, is simply ignored in such seams and undercutting is made obligatory.

Strict Regulations Bring Results

The regulations in mining there are so strict that the finding in one miner's full-shift output of a quart of slate or bone would call for investigation by the management. If persisted in, the act would show carelessness on the miner's part and be the means of further official inquiry, and cause much trouble for the unfortunate miner who loads too much dirt in his coal. The result is that each miner takes extra care to send out clean coal.

I am satisfied that, if most of our pick-mined coal was strictly undercut before the shooting is done the more lump coal would be produced and less dirt loaded; because the chances for cleaning the coal are much greater than in solid shooting, where the coal is badly pulverized. Every miner should know he will generally get steady work by producing clean coal, which should make him more careful in loading.

Gans, Pa. R. W. LIGHTBURN.

How Would You Work This Coal Bed?

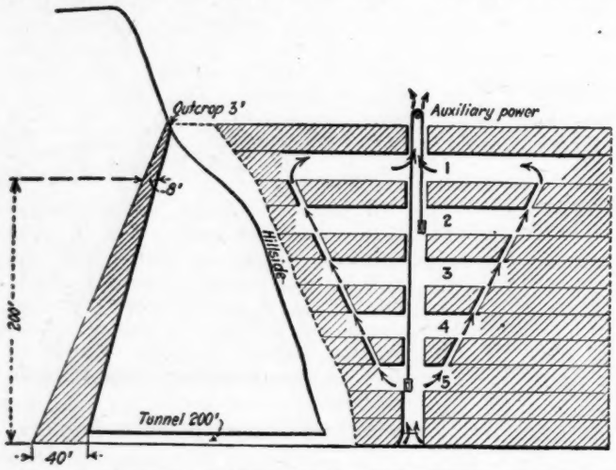
Horizontal tunnel will intercept coal bed 240 ft. from outcrop—From this a rise and airway will be driven.

I HAVE been much interested in the discussion of the best method for mining vertical beds of coal. I enclose a plan recently submitted to me for the development of a bed of coal that I am holding under lease. The conditions are somewhat different from those heretofore discussed, as I have good walls and the coal can be reached from the side of the hill by a horizontal or nearly horizontal tunnel.

In reality, the problem of working a bed of this kind, however, always is the same. It consists in obtaining economical production, bringing the mine to maximum capacity as soon as possible,

obtaining good ventilation, the least possible degradation of the product and maximum recovery with minimum risk to the men employed.

As may be seen from the accompanying sketch, it is proposed to drive a horizontal tunnel or haulage road into the hillside to intercept the coal bed 240 ft. from the outcrop. It is estimated that this tunnel will be 200 ft. long. Thereupon an airway is to be driven downward from the outcrop to meet the end of the horizontal tunnel. This airway will be driven in the coal and made large enough to accommodate a double skip for lowering coal to the haulage road within the horizontal tunnel or drift. Headings will be turned off the airway at regular intervals on either side. The upper headings are kept in advance of those lower down. Side airways also will be driven up through the pillars as the headings advance. Coal will be loaded into cars in each heading and lowered to the haulage road by gravity.



CROSS-SECTION AND VERTICAL PROJECTION OF SEAM

To reduce breakage or degradation to a minimum the coal will be loaded directly into cars, but when desired it can be sent down the air chutes and spouted into cars in the heading below.

As outlined this plan is said to render unnecessary the expense of mechanical ventilation, pumps or other drainage apparatus, large hoisting engines and the power required to operate such equipment. I would be glad to have the opinion of experienced miners as to the practicability of this plan of development and operation.

Detroit, Mich. C. C. CLAYBERG.

Erecting Brattice in Rooms

Practical points regarding the erection of brattice in rooms and headings—Carry brattice up on high side of opening—Reduce area at inbye end of brattice—Lap joints of canvas in direction air is traveling.

SOME time ago an inquiry appeared in *Coal Age* (Oct. 13, p. 587) where a bratticeman asked for information in regard to the right way of erecting brattice in a room or heading.

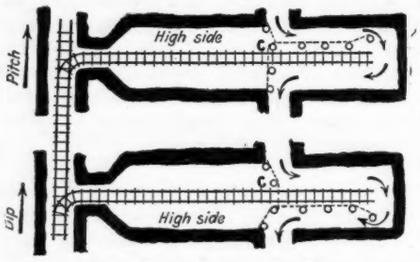
In replying to this inquiry, the usual directions were given for building a brattice; but, to my mind, several important points were omitted that might well have been mentioned. Allow me to refer to a few of these points gained from my own experience.

In the first place, let me say, one should avoid the use of canvas or brattice cloth whenever a permanent line of brattice is to be built. Cloth should be used only for temporary purposes, as when a body of gas that has accumulated at the face of a heading or room is to be removed for safe operation.

Where there is a high and a low side, my practice is to carry the brattice on the high side of the opening. As far as practicable, I prefer to give the intake side as large a sectional area as possible, making it equal to the return side whenever this will not obstruct the roadway.

In the accompanying figure, I have shown two cases. In the upper half of the figure, the air enters the room through a breakthrough on the high side and returns on the low side, after sweeping the face of the breast.

In the lower half of the figure, the air is shown as entering on the low side of the room and returning behind the brattice on the high side. It will be observed that, in each case, the line of brattice is built on the high side.



SHOWING BRATTICE ERECTED ON HIGH SIDE

Another important point, which I have found very effective in removing gas from the face of a breast, is to deflect the ends of the brattice toward the rib, so as to reduce the sectional area at that point and give the air current a greater velocity passing the face. This is shown clearly in the figure.

Practice has taught me the importance of one other point that is commonly overlooked by bratticemen. When hanging canvas, the end of the cloth is commonly tacked or nailed to the last post and the next piece tacked over this when the brattice is extended.

Instead of lapping the cloth in this manner, however, a better plan is to first loosen the end of the cloth from the post, when about to extend the brattice, and nail the end of the second strip under the first. The first piece is thus made to overlap the second so as to form a joint lapping in the direction in which the air is moving.

I have found that this plan of lapping the cloth is very effective in preventing the leakage of air through the joints. The plan may be a little more trouble than the usual method but it pays in the end.

It hardly seems necessary to mention here, a point to which attention has been called in previous issues of *Coal Age*, that the work of hanging the canvas to the posts must be performed on the intake side, as shown in the figure. No practical miner would attempt to hang canvas, working on the return side of the brattice, where he would be exposed to the gas.

Linton, Ind. W. H. LUXTON.

Dangerous Practices in Blasting

Puncher may be used for undercutting where chain undercutter is unsuccessful — Don't mix two grades of explosives—Inadvisable to shoot off the solid.

THE dangers from shooting off the solid are grave, because of the danger of a blown-out shot. Powder has not the same strength as dynamite, and if a shot is placed too far on the solid it will blow out.

When coal is too hard to mine by hand, with a pick, this process being little used today, or where a chain undercutter is not successful, a puncher may be used to undercut and shear the working face, and more lump thus produced. Mixing two grades of powder or powder and dynamite should not be tolerated because one is "quicker" and will explode before the other.

In small mines shooting off the solid is the method usually followed because of the cost of undercutting. If gas is present it should be swept away by a strong air current and dust avoided by spraying the face of the room with water. By these means the danger of mine explosions could be avoided, but great care is required.

My advice would be: Under no circumstances shoot off the solid.

Rawdon, Quebec. C. MCMANIMAN.

Co-operation Comes Through Leadership

Lack of progressive management in the coal industry — The average mine foreman — Relation of foreman to superintendent—Bone of contention in examination and certification — The successful boss a leader of men.

MOVING along without friction is a problem for everyone to overcome. The position of mine foreman offers no exception to this rule. Bossing a coal mine is not a special condition requiring more skill than other classes of work.

Occupations of every kind are found to present their own peculiar problems. In every calling there are obstacles to overcome and the successful worker is the man who realizes this fact and has learned to control each situation as it arises.

It has been intimated, by those who pretend to know, that the coal industry lacks progressive management and, in this respect, is trailing behind other callings and occupations. The reason given for this assertion is that there exists a scarcity of men of large calibre holding official positions in coal mining.

Men who have given these matters more careful study, however, fail to reach the same conclusion. The larger coal operations today are managed by men of clear vision who are broad minded and fitted in every way to cope with the peculiar problems that confront the management of coal mines.

In the order of their importance, the men in charge of a successful coal operation are the following: Manager, mine superintendent, foreman, assistant foreman, fireboss, master mechanic and store manager. All of these are linked in the chain of operation and if any one link is not functioning properly the chain is weak. There is discord and lack of co-operation.

Wrong Estimate of Mine Foremen

Reading some of the letters that have appeared in *Coal Age*, one might infer that the average mine boss of today does not possess a trained mind. He is described as a "plodder," void of personal efficiency, often easily discouraged and inclined to be irritable and without tact.

If just one-half of this was true, it would be time that something should be done to create a different class of men for the position of mine foreman—a position involving the direction and supervision of mining coal on an economic basis.

Other industries have learned that the successful boss is a leader of men, standing head and shoulders above the ordinary workman, mentally. Such men never have trouble in gaining and holding the respect of the men in their charge. A characteristic of such a man is the favorable consideration he gives to all who come to him.

Mention has been made, from time to time, of the relation of the mine foreman to his superintendent. Better results might be obtained, in some instances, no doubt, if each of these men was made absolutely responsible for his own department of the work; but there is a grave question as to how such an arrangement would operate practically.

What Is Lacking in the Present System of Management

The system of making the mine superintendent responsible for the entire operation, under and above ground, has proved a success in most cases. Where the system has not been able to operate smoothly under this plan, it is clear some one has much to learn relative to co-operation and management.

The real bone of contention, in most cases, appears to be the fact that the mine superintendent is not required by law to take the examination, or hold a certificate of competency, as the foreman under him and subject to his orders is obliged to do, by law. In some cases, no doubt the examination and certification of mine superintendents would be a step forward.

However, without going further into this phase of the matter, let me say that there would be far less misunderstanding between the mine superintendent and his foreman if the former possessed the practical training and knowledge that would enable him to visit the mine workings, at least once a week, and give intelligent orders and direction regarding the work.

Weekly visits of the superintendent, passing through the entire mine, will do more to stimulate a better working spirit among the men and bring about a better understanding between himself and the foreman, concerning matters of common interest, than any number of official meetings in the office, to which the mine foreman is regularly summoned and required to explain items of the cost-sheet that the superintendent should understand from his own observation and practical knowledge.

In closing, let me say that what the coal-mining industry needs, today, more than anything else is the hearty co-operation of officials and men in every branch of the work. The successful boss, whether mine superintendent or foreman, is himself a leader of men. It is that characteristic that draws other men toward him and commands their respect and obedience.

Pikeville, Ky. GEORGE EDWARDS.

Inquiries Of General Interest

Smokestack Settled Out of Plumb

Assuming Stack a Rigid Unit, Distance Out of Plumb Is Proportional to Settlement at Base—Danger Due to Wind Pressure and Lack of Stability of Construction—Reference to Leaning Tower of Pisa

CAREFUL measurements taken at the base of a brick stack have shown a settlement of one inch, on one side of the base, which rests on a solid masonry foundation. The stack is 165 ft. high and measures 25 ft. in diameter, at the base, and 6 ft. in diameter, at the top. The question has been asked, how much is the top of this stack out of plumb. SUPERINTENDENT.

Briceville, Tenn.

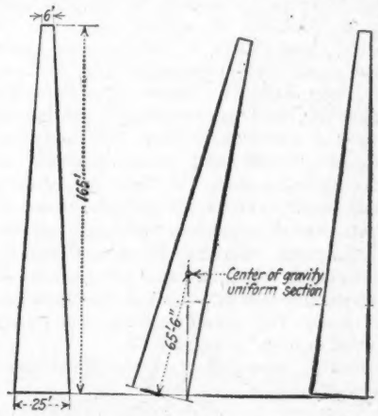
The question of ascertaining how far the top of this stack is out of plumb is solved by a simple proportion if the entire stack is considered as a rigid unit. For example, the settlement on one side of the base being one inch shows a movement of one inch in 25 ft. Then, the movement at the top of the stack will be as many inches as the height of the stack is times greater than the base; or $165 \div 25 = 6.6$ in.

Just here, it might be well to ask the further question: Is this stack in danger of falling? Also, what further settlement must take place before the situation becomes dangerous?

These questions can only be answered in a general way, as the elements entering into the problem are largely indeterminate and no data are given that would enable a fair calculation of the height of the center of gravity of the stack above its base.

The fact that a settlement of one inch has already taken place, at the base of this high stack, raises a grave question as to the nature of the substratum on which the foundation rests. It may be that this is such that no further settlement need be anticipated. Assuming that to be the case, if the stack has been properly designed and rests on a substantial stone foundation, the thickness of the brick wall decreasing in proportion to the height above the ground, there is no reason to be alarmed by reason of the present settlement. This should be carefully watched, however, to ascertain that it goes no further.

The accompanying figure shows three conditions, which are assumed on a



purely theoretical basis, as a means of discussion only. On the left of the figure the stack is shown erect, while on the right it is tilted sufficiently to make one side vertical.

Again, between these two positions just mentioned, the stack is shown tilted so that its weight, acting through an assumed center of gravity, passes through the edge of the base. In this case, the center of gravity was calcu-

lated for a uniform thickness of wall, from the bottom to the top of the stack, which is far from being the case in a properly designed stack, where the center of gravity would fall much lower than that shown in the figure.

Neglecting wind pressure and assuming that the structural strength of the material is sufficient to prevent rupture, theoretically the stack would stand as long as the vertical line through its center of gravity falls within the area of the base.

It is compliance with this law of physics just stated that has enabled what is probably the most famous out-of-plumb structure in the world—the Leaning Tower of Pisa—to survive the centuries since its erection. Unfortunately, however, the bond in brick masonry and the bricks themselves are mechanically weak, and wind pressure also cannot be neglected with impunity.

Taking these facts into consideration, it might be assumed that the danger point has reached its extreme limit when one side of the stack is vertical, as any further movement in that direction would give rise to a sliding tendency in the bonding of the material. This condition is reached when the out-of-plumb distance of the top equals half the difference of the top and bottom diameters; or, in this case, $\frac{1}{2}$ (25 − 6) = 9½ ft., corresponding to a settlement at the base of 12 (9½ × 25) ÷ 165 = 17.27 in.

As a matter of fact, however, this stack would probably become decidedly unsafe long before any settlement of this magnitude had taken place. How far the settlement at the base may be allowed to proceed before this stack should be considered dangerous is a question of judgment. We would suggest that a settlement of six or eight inches, in this case, would be an extreme limit of safety.

Examination Questions Answered

Miscellaneous Examination Questions

(Answered by Request)

QUESTION—*If water weighs 62.5 lb. per cu.ft., and steam, at atmospheric pressure, has 1,640 times the volume of water from which it was generated, what weight of steam would be used, per hour, by a pair of engines, 30-in. cylinders and 5-ft. stroke, making 30 r.p.m. and discharging steam at atmospheric pressure?*

ANSWER—In general steam practice, the terminal pressure in the cylinder, at the moment of release when the exhaust value opens, is considerably above the atmospheric pressure, for non-condensing engines, which is a common type of hoisting engines installed at mines. For this reason, the only assumption that will make possible an intelligent answer to this question is that the steam in the cylinder expands down to atmospheric pressure at the moment of release. Even on this assumption, the calculation would be practically worthless since no allowance is made for condensation and clearances, which always form a very considerable percentage of the total quantity of steam consumed.

However, ignoring these two factors, condensation and clearances, and assuming there are four compressions in the steam in the cylinder previous to cutoff, if the engine cuts off at ¼ stroke, the steam will have expanded down to atmospheric pressure, at the moment of release, very nearly. Under this assumption, the cylinder displacement, in cubic feet per minute, or per hour, will give approximately the volume of steam consumed in that time, measured at atmospheric pressure; and if this is 1,640 times the volume of the water from which it is generated, the weight of steam will be given by dividing the cylinder displacement, in cubic feet, by 1,640 and multiplying the result by 62.5.

In the present case, the area of each 30-in. cylinder is 0.7854 × 30^2 = 706.86 sq.in. The piston displacement, per stroke, for the two cylinders, is then 2 × 5 × 706.86 ÷ 144 = 49.09, say 50 cu.ft. An engine running at 30 r.p.m. makes 60 strokes per min., which gives for the total piston displacement, per hour, 50 × 60 × 60 = 180,000 cu.ft. On the assumed basis, the weight of steam consumed per hour is, then, 180,000 ÷ 1,640 × 62.5 = say 6,860 lb.

QUESTION—*How would you open and close the valves to start and stop an engine, as quickly or as slowly as possible? Give reasons.*

ANSWER—Steam is compressible, and the effect of the sudden arrest of the flow of steam is not like that when a flow of water is suddenly arrested by the closing of a valve. The sudden opening or closing of the steam valve or throttle will produce no other effect than a possible derangement of the rope connections on the cage or the position of the rope on the sheave or drum, provided the momentum of the cage is such as to produce a slack rope when the winding drum is arrested too suddenly by shutting off the steam and applying the brake. It is important, however, in hoisting, to start the engine slowly, so as to overcome the inertia of the cage gradually and not produce an undue strain on the rope connections and other parts of the winding gear.

QUESTION—*If a circular shaft, 28 ft. in diameter and 200 ft. deep, is half-full of water, what horsepower will be required to pump it dry in 10 days, working 24 hr. per day?*

ANSWER—The cubic contents of this shaft, for half its depth, is 100 (0.7854 × 28^2) = 61,575 cu.ft. Taking the weight of a cubic foot of water as 62.5 lb., the weight of water in this shaft when it is half-full is 61,575 × 62.5 = 3,848,437 lb. The average height that the water must be lifted being 150 ft., the effective work performed per minute is

$$\frac{3{,}848{,}437 \times 150}{10 \times 24 \times 60} = 40{,}087 \text{ ft.-lb.}$$

The required horsepower, ignoring friction, is therefore 40,087 ÷ 33,000 = 1.21 hp.

QUESTION—*What is meant by a windy shot and what is its cause?*

ANSWER—The general meaning of the expression "windy shot" is a shot in which the force of the explosion is, in part, expended on the air, producing a heavy concussion of the mine air.

This effect may result from any one of several causes. For example, an excessive charge of powder; the seaming out of the shot in a soft stratum of coal; ineffective stemming or tamping of the shot; or the blowing out of the shot through crevices in the coal may produce a windy shot. A similar effect is produced, at times, when different grades of powder are used in making up the charge, the finer powder exploding first and blowing the coarser powder into the air where it is burned. A windy shot may result, also, from the use of coal dust or slack in tamping the charge.

QUESTION—*What are the dangers incident to windy shots?*

ANSWER—A strong concussion of the air, caused by a windy shot, will raise a cloud of dust, which may be ignited by the flame of the shot and produce a local dust explosion. Whenever gas or dust is present where a windy shot occurs the flame of the shot will travel a considerable distance down the room and may extend out on the entry.

QUESTION—*When two kinds of powder are used in the same hole, what is likely to be the result?*

ANSWER—The finer powder ignites more quickly and its explosion will blow the coarser powder from the hole, with the result that the latter is exploded on the air, producing a heavy concussion of the air and raising a cloud of dust, which is at once ignited and adds to the force of the explosion.

QUESTION—*Could a safe shot that did its work immediately succeeding a windy shot, produce a disastrous explosion?*

ANSWER—Yes. The dust cloud and gas produced by the windy shot will generally be ignited by the flame of the succeeding shot, which would otherwise be safe, and a more or less local explosion of dust and gas result.

The Weather Vane of Industry

News Notes Chronicling the Trend of Industrial Activities on Which Depends the Immediate and Future Market for Coal

CONDITIONS in the United States today indicate that the year 1922 as a whole will be more satisfactory to business than the year just ended, according to January *Commerce Monthly*, published by the National Bank of Commerce in New York. "Our forecast," the publication continues, "is that profits will depend more on ecomony of operation than on expansion of volume. With the money favorable factors now operating, business men should not fear to make plans for the new year, but they should plan with care and conservatism, and with constant effort toward reduction of costs.

"Financial improvement continues. Progress has been made in reduction of excess stocks of manufactured goods. Accumulations of raw materials have been reduced. The rate of production in the major industries have shown little change during the closing weeks of the year. Losses in some lines have been offset by gains in others, the net result being that the gains over the low level of the earlier months of 1921 have been held.

"Retail trade during the last three months has been better than was justified by agricultural and industrial conditions, even though it has been disappointing to those who as yet have failed to recognize that the public has little inclination for maintaining, under present conditions, the various profits between original production and sale to the consumer.

"In most wholesale lines the closing weeks of the year are normally dull, with the approach of inventory period. Quietness is more marked than usual this year because of doubts as to the volume of spring trade. Reduced purchasing power forces those classes of consumers which represent the bulk of demand—farmers, wage earners and salaried people—to direct their buying into the low and medium-priced lines of goods, and there is uncertainty as to the extent of their purchases.

"International trade is slowly returning to old channels. Throughout the world there is a determination to work and to save. Above all, producers and consumers of every country must set themselves against the waste of and the preparation for war. The economic structure of the world can no longer bear the burden involved. Peace is the only foundation on which man can build, and fortunately the progress of discussions at Washington is bringing definite assurances of constructive results."

Orders for 25,000 Cars Pending

Chicago reports, according to the *Iron Age*, give encouragment as to car orders. About 25,000 freight cars are expected to be placed in that district early in the year, whereas for the whole country 1921 yielded only 20,000. The Burlington probably will close for 7,300 cars soon and the Illinois Central will take early action on 2,200. The Seaboard Air Line, besides buying 25 locomotives, has placed 2,000 to 2,500 cars with the Fairfield (Ala.) plant. For the Norfolk & Western 4,000 cars are under negotiation. The Union Pacific has increased its recent inquiry for 1,500 freight cars to 5,500. Rail buying is not on the scale of a year ago. Upward of 400,000 tons are under contract for 1922 and the Pennsylvania order is an early prospect.

Locomotive Shops Re-employ 400

Four hundred men, employees of the West Springfield (Mass.) locomotive shops of the Boston & Albany R.R., resumed work Friday, Jan. 6, when the shops reopened after two weeks' shutdown. The layoff was due to business conditions.

Copper Mines Will Resume

Many copper mines are to resume operations this month, among them Anaconda, Butte & Superior, North Butte, Davis Daly and Tuolumne, according to reports current in Boston. Kennecott produced 4,914,000 pounds of copper in November, compared with 4,277,000 pounds in October and 11,146,000 pounds in November a year ago.

Ford Plant Reopens

The Ford Motor Car Co.'s Highland Park plant, which closed Dec. 22 for inventory, reopened Monday, Jan. 9. "We will keep 40,000 men on the payroll," Edsel B. Ford, president of the Ford Motor Co., said. "Only 32,000 men will be working at any one time. However, we will continue to rotate our men so that employment will be given the greatest number." Business conditions will improve slowly but steadily during 1922, he expects.

Nail Plant to Blow in Furnace

The Kelly Nail & Iron Co. reports that its Sarah furnace at Ironton, Ohio, will blow in early in January.

Paper Mill Increases Force

The Northern Paper Mill of Green Bay, Wis., is not only back to normal but is employing fifty additional men and making plant extensions to care for a banner year in 1922. All its machines are operating night and day to create a reserve stock. Judson G. Rosebush, the manager, told his sales force in conference that liquidation, easier money, better exchange rates, and the disarmament conference insured an early end of depression. The sawmill of the Diamond Lumber Co. at Green Bay, closed since July, reopened on Jan. 3, due according to J. T. Phillips, the manager, to prospects for a building boom.

Idle Freight Cars Increase

Idle freight cars on Dec. 23 numbered 552,373, an increase of 21,036 compared with Dec. 15, it was shown in a report issued by the Car Service Division of the American Railway Association. Of the total, 404,214 were surplus freight cars, an increase of 32,993 over the total on Dec. 15. The report showed that surplus coal cars numbered 197,232, an increase of 10,724.

To Erect $500,000 Steel Plant

The Great Southern Steel Corporation has qualified with the State of Alabama for the erection of a $500,000 plant at Birmingham, Ala., for the manufacture of steel products The company, which is a Delaware corporation, is capitalized at $15,000,000 and owns 10,000 acres of coal and ore lands in Etowah and adjoining Alabama counties.

Further Pre-eminence of Coal as Fuel Seen with Exhaustion of Mexican Oil Wells Near

Several Major Pools Ruined by Salt Water—Yield of Others Curtailed—Producing Wells Subjected to Excessive Exploitation to Maintain Output—Large Companies Take to Colombia Field

BY H. S. LAW

(Written for *Coal Age*)

WITH several of the major oil pools of Mexico practically ruined by salt water and the production of other areas becoming increasingly smaller due to the same cause, the coal industry of America, and in fact the coal trade throughout the world, can look forward to the coming year as promising interesting developments.

The Mexican fields, which in recent years played a most important part in keeping the fuel oil market of the world supplied, if not oversupplied, with cheap liquid fuel are now rapidly approaching a crisis. One by one fields noted for their wonderful productivity have collapsed with nothing in sight to take their places.

Those who are closely watching the Mexican oil situation and studying the probable effect of salt water encroachments from the viewpoint of the coal industry believe that not before well along in the year will the cumulative effect of what has taken place and what is taking place in the Mexican oil fields become actually felt in America and elsewhere.

If the exhausted valuable oil-producing properties were confined alone to the Panuco-Topilo (heavy-oil) fields of Mexico the situation would not be so serious from the viewpoint of those companies operating in that country, but the fact that many of the remarkably prolific pools constituting what is generally known as the "South Fields" (light-oil district) have already been ruined and that others are going that way creates a situation which, to say the least, is decidedly favorable for those engaged in producing and marketing coal.

The failure of some of the great pools in the "South Fields" is exceedingly important in view of the fact that the producing sectors or pools in that territory have in the past produced more than 600,000,000 barrels of oil, or 75 per cent of Mexico's output.

While about 80 per cent of Mexico's light crude finds its way into the fuel oil market, the remaining 20 per cent represents its yield of gasoline, kerosene and lubricants. The heavy oil of the Panuco fields is used almost entirely as fuel oil. It has not been much of a factor, however.

ENTIRE PRODUCTION NOW LIMITED TO FEW FIELDS

While it cannot be denied that Mexico is still producing a large amount of oil its real weakness lies in the well-known fact that practically all its production, notably in the "South Fields," is now being taken from two or three pools, whereas a year ago almost three times as many pools were producing clean oil in large quantities.

Excessive exploitation of these much overworked producing zones to keep up production is subjecting them to a test unequalled in the history of the oil fields of that country. Competitive drilling and mad haste to get out oil while it is being produced free from salt water tends to early exhaustion. Oil producers are most anxious that such an event be postponed, at least until these fields have produced considerably more oil. Under present conditions men now engaged in the producing areas are singing, "Where Do We Go from Here?"

At present practically the entire burden of production is falling on the pools or sectors in the light-oil district known as the Cerro Azul and Toteco. These pools are now producing approximately 400,000 barrels of oil a day, and pipe lines that have been rushed into these pools have a capacity for transporting that amount of oil.

Some geologists estimate that under present conditions the Cerro Azul and Toteco pools may hold up three or four months longer, even allowing for the way the fields are being drawn upon by the pipe lines. The appearance of salt water in either pool would mean the rapid decline of the only important light-oil producing area in Mexico and would mark the closing chapter of the story of the celebrated "South Fields," which have done more than any other territory to make Mexico the second largest producing country in the world.

The chief reason why the downfall of many of the most important producing fields of Mexico is receiving so little attention at this time is that, despite the destructive work of salt water intrusion, shipments of oil from that country are still large. The fact that salt water has greatly reduced the number of producing areas, forcing the comparatively few zones that as yet are free from salt water to make up the decline in production suffered in the fields already abandoned and others slowly nearing exhaustion, naturally won't have much effect on the average man just so long as he knows that shipments are being made from Mexico in good-sized quantities.

At this writing Mexico as an oil-producing nation—as a country which last year produced 27½ per cent of the world's oil supply—has a maximum future of about four months, according to some well-known geologists. Within that time, it is said, new fields with large production must be brought in, else Mexico's shipments will dwindle down to unimportant quantities.

USERS OF OIL FUEL FACE SERIOUS PROBLEM

There are some interests, however, which are well aware of what is happening in Mexico. They have reason to feel somewhat worried about developments in the oil fields of the southern republic, for they have in recent years relied too much upon that country. Believing that fuel oil would always be a drug on the market, due to Mexican production, many industrial and marine companies have been relying on fuel oil to a degree which now, naturally, causes considerable discomfort. Converts to fuel oil find it difficult to admit that they are confronted with a serious problem. Some, however, who have seriously studied the possible result of the elimination of Mexico as an oil-producing factor are frank to admit that should that take place in the near future fuel oil prices would be such that coal would take its place where economy in operating costs was the watchword.

The hope that some time, somewhere in Mexico, another new and great oil field or fields—another "South Fields"—will be uncovered has done much to minimize the economic results of the threatened peril in the Mexican oil fields. Regardless of all these hopes no new field or fields separate and distinct from the old ones has been uncovered in Mexico since the time salt water first made its unwelcome appearance there. Operators in the Mexican oil fields have not yet discovered the presence of any possible successor to the famous "South Fields" now undergoing a tremendous strain. During all the time salt water has been percolating through the old areas, turning most valuable properties into desert lands, oil operators in that country have been searching diligently for new producing fields. Their efforts so far have been in vain.

Assuming that new fields are discovered, the cost of producing from them will be very high. It is generally agreed that whatever new territory is opened up it will be

considerably different from the old producing areas located near the sea coast, where operating costs were at a minimum and where the presence of oil was, to a large degree, determined by oil seepages. In searching about the interior or near interior of Mexico for prospective oil fields, operators will have to proceed by first selecting acreage that looks favorable and trying it out by the costly method of test drilling. The most optimistic oil operators in Mexico expect only ordinary wells of the 1,000-barrel per day class in whatever new fields may be developed inland, the "gusher" type of producers so common in the old fields being considered out of the question in future oil developments in that country.

There is not much incentive for companies that have heretofore been operating in the cheap gusher fields of Mexico to continue their operations in other sections of that country, which may produce a fair volume of oil, but at a maximum of cost.

In reviewing the Mexican oil situation the Standard Oil Co. of New Jersey, in its official publication, *The Lamp*, referred to the prospects of higher operating costs, etc., as follows:

"It should be remembered that further back from the sea coast the greater is the expense of producing and moving the oil. As has been pointed out in these columns heretofore, the cost of building roads, pipe lines and railroad connections is, as a rule, much greater than the actual drilling expense. If foreign companies could have foreseen the difficulties (political) other than those purely physical which have attended their efforts to profit by the development of Mexican oil areas, they would never have invested the huge sums which have gone into the present producing fields. To go further inland, even if it were definitely known that the present wells could be duplicated, would require inducements which are not offered by the present conditions covering production in Mexico. Under prevailing taxes it would be manifestly impossible to earn a profit on the millions of dollars which will be required to explore, drill, construct roads through difficult country, lay pipe lines and take care of all of the other needs of a producing business.

"All of the oil taken from Mexico today has come from big wells, where the cost per barrel has been down to the minimum. If Mexico is to continue to figure it will be necessary to assume the heavier cost per barrel of getting oil from small wells. This work is not justified by the prevailing margin of profit after paying taxes."

Attractiveness of Mexican Field Near End

American refiners in seeking Mexican crude oil in past years did so because of its low cost and ample supply. By the elimination of these elements the attractiveness of that country as a crude oil producing source will cease.

There are many who predict that long before any new and important field or fields is developed the present sectors will decline in production to the point that will cause the companies operating there to fall back on storage stocks entirely, and inasmuch as these stocks have been liberally drawn upon in recent months in order to move out stored oil before the threatened increase in the Mexican export oil tax is imposed, aid and comfort derived from Mexican oil storage tanks will be of short duration.

Suspension of oil shipments from Mexico for any length of time or Mexican oil shipments reduced to a small volume would bring about a real sensation in the oil industry of America because the great refining plants of the more important oil companies located on the Atlantic seaboard and the Gulf Coast have been expanded to their present size because Mexican crude oil was always available in large quantities. With their modern cracking processes, these plants were always able to utilize enormous quantities of Mexican light crude, mixed with smaller amounts of American light oil, and from that mixture valuable refined products were obtained, fuel oil being about the last run from the plants. These companies developed their tidewater refineries to enormous size on the assumption that the Mexican light-oil fields would for many years produce an unlimited supply of cheap oil. Complete failure of the Mexican fields would mean that those refineries would have to turn to the oil fields of America, or possibly South America, for supplies. Under such circumstances it is certain that prices of American oil will advance to new high levels. By greatly increasing refining costs there will come sharp advances of refinery products. This, of course, will include fuel oil.

Action on the part of the large buyers of American crude oil in recently advancing the price of mid-continent crude 100 per cent within a period of a month was prompted, according to well-informed oil men, entirely by the desire of refining interests of this country to encourage production here in order to meet the situation that is developing as a result of the failure of the Mexican fields. Realizing that the Mexican situation would make it necessary to use more and more American crude oil, the major oil organizations of this country, according to reliable authority, sharply jumped the price of American crude, with the result that production in this country was stimulated.

Inasmuch as fuel oil is to a large degree a refinery by-product it is scarcely necessary to say that when refineries find they must depend entirely on high-priced American crude, fuel oil will advance in price. There always will be fuel oil available for those who are willing to pay the price for this commodity produced under much higher costs. When that time arrives fuel oil will lose much of its attractiveness as a power-generating factor, and many of those now using it will be in the market for coal. The critical situation in Mexico now makes it possible for men engaged in producing and marketing coal to smile at those who, up to a short time ago, predicted that a cheap, unlimited supply of liquid fuel would tend to reduce the importance of the coal producer and distributor.

Much has been written about the potential oil reserves of Mexico. There is something fascinating about estimating the amount of oil which may be found beneath undeveloped territory, but the only agency that will finally determine whether oil does or does not exist is the drill bit.

Big Companies Now Look to South America

An interesting fact in connection with the potential oil reserves of Mexico is that the Standard Oil Co. of New Jersey, which in the past has derived much oil from the Mexican fields and later suffered severe losses there, is now turning to Colombia, South America. The Standard has acquired a large amount of acreage in Colombia and is proceeding with a campaign which leads many to believe that it considers that country the big oil reservoir of the future. Recently the Standard Oil Co. of California in reaching out for foreign oil fields passed over Mexico entirely and acquired a controlling interest in more than 1,000,000 acres of Colombia lands located on what appears to be good geological structure. The Texas Company, one of the largest independent oil companies of the country, also has entered the Colombian fields, despite all that has been said regarding the "limitless possibilities of the potential oil lands of Mexico."

Although there is absolutely no indication at the present time in the way of advances in the price of fuel oil as to what is developing in Mexico, there is, however, one fact that is quite noticeable; that is the abandonment of the fuel-oil propaganda campaign spread broadcast up to a short time ago. There is no longer heard anything about propositions to lay pipe lines under the highways and byways of the great centers of population and in the industrial centers of the country and in this way serve fuel oil just like a city water supply. The trouble with schemes of that sort is that conditions make it impossible to contract for fuel oil for anything like a long period. The truth of the matter is that the larger oil companies do not want to sell any great amount of fuel oil at present prices. They are not looking for business. They are, however, storing plenty of fuel oil, using for that purpose every available inch they have.

While oil companies with plenty of steel tanks can quite readily store away oil, the average consumer of fuel oil has not the facilities for doing this. Fuel oil cannot be thrown into a vacant field and held there until wanted. Steel tankage is essential for keeping oil, and steel storage costs considerable money to erect.

November Mine Fatalities 51 Less Than Year Ago; Ratio to Output Higher

IN the month of November 146 men were killed in and about the coal mines of the United States, according to reports received by the Federal Bureau of Mines from the various state mine inspectors. The figures represent a decrease of 51 fatalities, or about 26 per cent, as compared with November, 1920, in which month 197 men were killed at coal mines. Based upon an estimated output of 42,814,000 short tons in November, 1921, the fatality rate is 3.41 per million tons produced. The rate was 3.34 in November, 1920, when the production of coal was 58,898,000 tons.

Of the 146 fatalities, 105 were at bituminous mines throughout the country and 41 at the anthracite mines in Pennsylvania. Fatal accidents at Pennsylvania bituminous mines numbered 23, a decrease of 6 as compared with November a year ago; there were 20 fatalities in West Virginia, a decrease of 6; 16 in Illinois, a reduction of 2; 10 in Ohio, a reduction of 1; 6 in Alabama, a decrease of 13; and 5 in Kentucky, a decrease of 13.

During the first eleven months of the present year 1,794 men have been killed by accidents at coal mines, against 2,077 killed during the corresponding months of 1920, a decrease of 283 fatalities, or 14 per cent. The output of coal for the same months was 457,259,000 short tons in 1921 and 584,641,000 tons in 1920, a decrease during the present year of 127,382,000 tons, or 22 per cent. These figures represent a fatality rate of 3.92 per million tons in 1921 and 3.55 per million tons mined in 1920.

The Public and the Price of Coal

(Editorial from the Chicago Journal of Commerce, Nov. 22)

THE coal committee of the Chicago Association of Commerce has unearthed some pertinent facts regarding the present cost of coal delivered to the consumer. It is a matter of record that coal today—anthracite, chestnut and range being used as the basis of comparison—is $7.70 more the ton than it was in September, 1914. Immediately the *Chicago Tribune* rises up to brand the coal operators and dealers as profiteers. But the Association of Commerce went a step further than the mere discovery of this $7.70 increase. They also traced the reason for this increase, thus giving the matter an entirely different aspect.

In September, 1914, local consumers paid $7.90 a ton for their anthracite. In the same month last year they were paying $15.60 a ton for the same grade of fuel. But, according to the report of the Association of Commerce, there has been an increase of $2.57 per ton in miners' wages. There was an increase of $2.67 per ton in freight rates. There was an increase of $1.10 per ton in other operative costs. There was an increase of $1.36 per ton in local delivery and yard costs. Figure this up and it will be found that the total increase in costs was exactly $7.70. This proves definitely enough why it has been found necessary to increase the cost of coal delivered to the consumer over the figure of 1914.

The *Tribune* in attacking the coal industry generally, draws a comparison between what it calls $10 coal and $1 wheat. In doing so it insults the intelligence of the public, for it figures its coal costs on a basis of coal delivered, while its wheat costs are as of wheat in the farmers' bins. Had it figured its coal on the "at-the-mines" basis, the result would have been entirely different. This, however, is not the *Tribune* method. In its pose as the friend of the people, in which it indulges in mock heroics that cost it nothing but its reputation for veracity, but which serve to cloak its greed and selfishness when it has an axe to grind, it hesitates at nothing. The mere fact that it is making a malicious attack upon a basic industry which had done everything within its power to lower the cost of fuel, does not worry the *Tribune*. It evidently believes the general public is blind enough and stupid enough to swallow its pronouncements whole and that in this way it will win the friendship of those it probably hopes to use for its own purposes when the time is right.

But Chicago business men know full well that the investigations made by the Association of Commerce are complete and authoritative and that this body in undertaking this work has only the interests of the public at heart. The report of the Association of Commerce committee makes the *Tribune's* distorted facts appear in their true light, and if the *Tribune* is capable of shame, it has good reason to hide its head, now that it has been found out.

It is beyond the realm of reason to talk cheaper coal until the railroads see their way to reduce the freight rate on the commodity. There is also one other solution to the high cost of coal problem, and that is entirely beyond the power of the coal operators and the coal dealers. This is the question of miners' wages. This class of labor is working under a contract the terms of which were fixed by the United States government at a time when living costs were inflated and there was need for high wages. In some parts of the country the miners have voluntarily accepted a wage reduction in keeping with present deflation. This has not been done, however, in those regions controlled by the Mine Workers' Union. The organized miners have absolutely refused to consider a wage cut, but on the contrary are agitating for the higher wage under the new contracts which are to be made next spring.

The matter is up to the people of the United States. If they would see a speedy decrease in the price of coal then let them bring to bear sufficient pressure to force the union miners to work for a wage commensurate with the present cost of living. Men in other trades, men whose work requires just as much labor, just as much risk and just as much skill as that of the miners, have submitted to wage reductions, thereby doing their part in bringing about a general deflation of all prices. But the miners, belonging to an organization which is arbitrary in the extreme, have exhibited no such altruistic tendencies.

West Virginia Engineers May Now Register

THE act to regulate the practice of professional engineering in West Virginia became effective July 27, 1921, and the date beyond which it will be unlawful to practice as a "registered professional engineer" is Jan. 27, 1922. Registration of persons who prior to the time of the passage of the act engaged in the practice of engineering is not compulsory, but such persons cannot use the title which the act provides. Application forms will not be sent out except in response to the request of individual engineers addressed to George E. Taylor, secretary, State Board of Registration for Engineers, 504-507 Coyle and Richardson Building, Charleston, W. Va. The official roster will include mining, civil, structural, mechanical, electrical, metallurgical and chemical engineers. The board is comprised of N. H. Mannakee, Bluefield; H. C. Cooper, Clarksburg; Frank Haas, Fairmont, and George E. Taylor, Charleston. Engineers legally qualified in some other state may practice in West Virginia for thirty days without obtaining registration if they do not take permanent residence therein. The registration fee is $20. Employees of an engineer or a registered engineer do not have to register unless they desire to take responsible charge of design or supervision.

Federal Reorganization Covers Coal Report

SINCE the whole matter of the reorganization of the federal departments is to be the subject of an early executive recommendation, it has been decided to make no change in the manner in which the weekly coal report is being issued. As a result of a recommendation by the directors at the National Coal Association consideration was given to the transfer of the weekly coal report from the Geological Survey to the Department of Commerce. There was opposition to the plan, however, and Commerce Secretary Hoover has announced that he regards the matter as one best handled as a part of the general reorganization plan.

BUSINESS LOOKS A LITTLE WAN—but not from lack of rest.—*Chicago Journal of Commerce.*

Georges Creek and Potomac Coal Operators To Discuss Wage Reduction With Miners

BOTH operators and mine workers in the Georges Creek region, realizing that a readjustment of wages is necessary if the mines in that field are to be operated, will hold meetings in the near future with a view to determining just what change in the agreement can be arranged. That the miners are not averse to accepting a cut is indicated by the fact that committees have been designated by the various local unions in the field to confer with a committee of operators.

Although the miners have not said just how much of a cut they will be willing to accept, the understanding is that they are prepared to accept a reduction of 25 per cent in mining rates, if by so doing they can be assured that they will have an opportunity to work regularly. The present mining scale in the upper Potomac and Georges Creek regions is $1.31 a ton. With that rate in effect operators say it is impossible to compete with non-union producers.

With a scale between 25 and 30 per cent lower than that heretofore prevailing the Manor Coal Co. has resumed operations in full at its mines at Vindex, in the upper Potomac field. The normal output of this company is about 1,000 tons a day, 200 men being employed at this plant. The reduction in wages was made as a result of the meeting of miners. A similar move is on foot in negotiations between the Dodson, Emmons and Smith interests and their employees.

Brings Action to Settle Debit and Credit Accounts of Tidewater Coal Exchange

A SUIT which has for its object the settlement of accounts between the debit and credit members of the Tidewater Coal Exchange has been brought in the Supreme Court of New York County by the Delaware Steamship & Commerce Corporation, a credit member of the exchange. The plaintiff, formerly known as Matthew Addy Steamship & Commerce Corporation, brings through its counsel, T. K. Schmuck, of New York City, the suit on behalf of itself and other credit members and shippers, more than 120 in number, against all debit members and shippers and asks for an accounting by them of the value of the coal, as fixed by the Executive Committee of the exchange for which they are debit members or shippers. According to the complaint, the plaintiff is a credit member for 5,040 tons of coal and is a debit member for 580 tons.

The defendants named in the complaint include William R. Coyle, trustee in bankruptcy of the exchange, and more than seventy coal companies and shippers who, the complaint says, "are either debit members of or debit shippers to said exchange. Plaintiff has no knowledge as to whether each of said defendants is respectively a member of or a shipper to said exchange."

The complaint says that during the existence of the exchange there were more than 72,000,000 tons of coal shipped to the exchange "to be held by said exchange for said members and shippers respectively who consigned the same."

The complaint further says that "upon information and belief, there is due to credit members of and credit shippers to said exchange, including plaintiff, jointly from the debit members and debit shippers the aggregate sum of $1,182,034.36, being the price fixed by the executive committee of the exchange for coal for which they are debit members or debit shippers, but plaintiff has no knowledge of the sum due severally from each of said debit members or debit shippers, defendants herein."

The plaintiff corporation demands judgment as follows:

That the right, title and interest of William R. Coyle, trustee in bankruptcy, in and to the subject matter of this action be determined; that the status of the accounts of the defendants, other than Mr. Coyle, with plaintiff and with other credit members of and credit shippers to the said exchange be determined and declared; that the status of the account of the plaintiff as a debit member of the exchange be determined and declared; that the defendants, other than Mr. Coyle, be severally ordered to pay to plaintiff and to other credit members of and credit shippers to the exchange such sums as may be determined to be due them, and for such other and further relief as the nature of the case may require and as may be just and equitable, together with the costs and disbursements of this action.

It is the contention of the plaintiff that when a member shipped coal to the exchange he did not waive title to it but became a tenant in common of the coal in pool in proportion to his shipment, and that when a debit member withdrew more coal than he owned in pool, he became a debtor for such coal to the owners of such coal. It will also be contended that the exchange was neither a debtor of the credit members nor a creditor of the debit members, but was merely a clearing house or bookkeeping establishment that kept a record of the members' accounts, acted as their agent in allotting coal and in fixing the prices thereof.

The theory of the pending suit will make possible the collection of moneys from the debit members in a single action, whereas under any other theory a separate suit against each debit member would have been necessary. Whether the suit will be affected by the bankruptcy of the exchange depends largely on the decision of the U. S. Circuit Court of Appeals in the bankruptcy case, which has not yet been handed down.

Keeney, Mooney and Blizzard Imprisoned

BAIL was denied to C. Frank Keeney, president of District 17, United Mine Workers of America; to Fred Mooney, district secretary-treasurer, and to William Blizzard, president of a sub-district, when arraigned in the Circuit Court of Logan County, West Virginia, on Dec. 28, and the three officials of the miners' union were remanded to jail for the time being.

They had surrendered themselves to Don Chafin, Sheriff of Logan County, at Huntington on the day following Christmas, with the understanding that they were to be given full protection, the Logan Sheriff making that guarantee. It was through the instrumentality of the Logan Sheriff that they were permitted to enjoy Christmas with their families, notwithstanding the fact that capiases from Logan County were pending against them.

Keeney, Mooney and Blizzard were arraigned before Judge Bland charged with conspiracy by the Logan County Grand Jury, such charges growing out of the armed march of last August and September. The three defendants face the same charge in Kanawha County. Harold W. Houston, counsel for United Mine Workers, of Charleston, will institute proceedings to have them liberated under a writ of habeas corpus.

Although Keeney professed ignorance of the plans of the uprising, when arraigned before Judge Bland, the prosecuting attorney of Logan County cited a speech Keeney made at Fairmont prior to the uprising in which the union official specifically spoke of the large number of men under arms in Kanawha County.

Maryland Commission Prepares a Mine Law

A SPECIAL commission has been appointed by the Governor of Maryland to revise the mining laws of that state. This commission is composed of William Milnes Maloy, G. Marshall Gilette and William J. Trickett. It has prepared a bill of 23 chapters and 167 sections which has been submitted to operators and miners for amendment and criticism. It has been suggested that miners consider the bill at local meetings and make any suggestions or amendments which may be deemed pertinent. Among other things the bill provides that wherever miners are paid by weight, operators shall install and maintain suitable and accurate scales. Under the terms of the bill mining companies will also be required to furnish first-aid equipment and keep it in a convenient place about the mines.

AS WE UNDERSTAND the tangled Far Eastern question, American business wishes to bring orders out of chaos.—*Tremont Tribune.*

Wage Reduction Ordered by Arbitrator in Tennessee-Southeastern Kentucky Field

ON Dec. 20 D. Stewart Miller, referee of the permanent arbitration board of the southeastern Kentucky and eastern Tennessee field, rendered a decision as to the wage to be paid hereafter in that field. It may be well to review some of the history of earlier negotiations. Prior to November, 1917, when an agreement was made at Washington, the operators and mine workers had signed no contract and there had been no organization in the district for fifteen years. The April, 1920, contract which followed was entered into by this field at Knoxville, Tenn., and was in a sense an open-shop agreement. It did not provide for the "check-off."

That agreement also provided that "unless authorized by the arbitration board to meet an extraordinary or unusual condition or otherwise provided herein, no operation is permitted to pay any other wage than that specified in the agreement." The board, having been asked to provide a decrease in wage owing to the unfortunate condition of the industry, failed to come to a conclusion, but when the matter was submitted to the referee he decided that the condition was extraordinary and unusual, orders for at least five million tons of railroad coal alone having been lost to the non-union fields of Alabama, West Virginia, Virginia, and to the Hazard field of Kentucky. The Southern Railroad Co. has transferred orders totaling 65,000 tons per month, or roughly, 750,000 tons a year, from the mines of the Tennessee-southeastern Kentucky region to the non-union mines along the Clinchfield road. The contracts signed are for five years. The Louisville & Nashville R.R., which bought its coal from Mingo Hollow mines for many years and continued to do so until last July, has now transferred this business to the Hazard field, where during the last few months wages have been reduced more than once. The referee further says that thirty mines in the region are already on the 1917 scale.

His decision is: That the various mining rates in effect Nov. 30, 1921, at the respective mines shall be reduced 20 per cent; that the charge for smithing shall be lowered from $1 to 50c. and that the following shall be the scale of wages for day labor in and around the mines:

Machine runners	$4.40
Motormen, blacksmiths and drum men	4.00
Engineers, carpenters, spike-team and boss drivers, head trackmen, head timbermen and bratticemen	3.84
Blacksmith's and carpenter's helpers	3.60
Machine runners and timbermen's helpers, couplers, single drivers, track helpers, wiremen, pipe men and pumpers	3.44
Unclassified inside labor, tippers and trimmers	3.20
Firemen	3.04
Teamsters and inexperienced coal loaders	2.80
Unclassified outside labor	2.72
Sandmen, greasers and yard couplers	2.64
Trappers and boys	2.00

He also rules that house rent must be reduced 50c. per room per month; that house coal be furnished at the respective mines in the same manner and at the same price as was ruling during the month of March, 1920; that companies shall reduce to the limit of their ability the price of merchandise in their stores; that in all other respects the Knoxville agreement shall during its life continue in full force and that the award shall be retroactive and date from Dec. 1.

Third Hearing of Coronado Coal Case by Supreme Court Set for Feb. 27

FOR the third time the case of the Coronado Coal Co. against the United Mine Workers of America, for treble damages under the Sherman law for destruction of its property during a strike, will be argued before the U. S. Supreme Court before a decision is rendered. The case already has been argued twice but before a decision was handed down there was a change in the personnel of the court, and now the court has ordered a third argument, which will be made on Feb. 27. Since the argument of the case at the last term Chief Justice White has died. Chief Justice Taft, his successor, was not present at the argument, and had there been a divided bench, 4 to 4 on the case, Mr. Taft could not have participated in the decision as he took no part in its consideration during the argument. As the invariable rule of the court requires argument before a complete court in important cases, Chief Justice Taft has ordered the case re-argued.

The case is of vital importance to the coal industry as it involves the question of whether labor unions are immune from prosecution and damages resulting from destruction of property during a strike. The coal company obtained a verdict in the lower court, which awarded it treble damages under the anti-trust law. This the mine union seeks to set aside on the ground that labor unions are not an entity at law subject to suit and from whom damages may be recovered. The case has been pending in the Supreme Court for several years and because of its vital importance the court has proceeded with the greatest deliberation in the various stages of its litigation.

Union Calls off Conference on New Wage Scale of Central Competitive Region

OWING to the unwillingness of the Pittsburgh and Ohio operators to attend a conference called by President John L. Lewis for last Friday, Jan. 6, at the William Penn Hotel, Pittsburgh, Pa., the meeting was cancelled Jan. 4 by Mr. Lewis himself. Mr. Lewis has issued this statement:

"Representatives of the mine workers will hold themselves in readiness to take part in such a meeting whenever it becomes possible for them to do so.

"Aside from the natural obligation to carry out the provisions of an agreement by which they are bound it is essential from a standpoint of public interest that a joint meeting of operators and miners be held.

"In no other way can the problems of the coal industry be solved, and in due time circumstances will compel such a meeting.

"It would be futile to convene such a meeting without adequate representation of the operating interests in the Central Competitive field, and this office has therefore been reluctantly compelled today to notify interested parties that the proposed joint meeting has been cancelled.

"It may be considered unfortunate that the substantial groups of operators in the Central Competitive field have seemingly forgotten or ignored their obligations under the provisions of the joint wage agreement."

The United Mine Workers of America believe that the operators of Illinois and Indiana are so greatly in favor of a renewal of the Central Competitive contract that they will bring pressure to bear on the other groups to enter into a conference with the union.

To Argue Constitutionality of Kansas Court

ARGUMENT on the constitutionality of the Kansas Court of Industrial Relations will be heard by the U. S. Supreme Court on Feb. 27. At the same time arguments will be heard on appeals of Kansas labor leaders from prison sentences imposed under the law for violation of anti-strike orders in the coal fields.

THE HANDS of the Federal Trade Commission have been materially strengthened by the decision of the Supreme Court last week in the case of the Beechnut Packing Co., wherein the court upheld the right of the commission to determine in each case what constituted unfair methods of competition in trade, subject to court review, in the absence of specific definition by Congress of what constitutes unfair competition. In the Beechnut case the court sustained the complaint of the commission that restrictions on resale prices constituted a hindrance of competition and the creation of monopoly.

THE STAFF WHICH is to conduct the study of intermittency in the bituminous coal industry has not been nominated at this writing. It was Mr. Hoover's intention to nominate this staff during the week ended Jan. 7, but, due to the fact that E. E. Hunt, secretary of the unemployment conference, has been confined to his bed as a result of a fall on the ice, he has not been able to confer with Mr. Hoover, and the selection of the personnel which will conduct the investigation has been delayed.

Would Solve Coal Problem by Nationwide Unionization and Equalized Costs

UNIONIZATION of the non-union coal-mining fields and the equalization in cost of production between the different states is the only possible solution of the coal industry problem, according to a statement issued recently by Philip H. Penna, secretary of the Indiana Bituminous Coal Operators' Association. Government intervention, he declared, appeared to be the only method of preventing a long period of idleness in the Central Competitive Field after April 1.

Mr. Penna said that since operators of western Pennsylvania and southern Ohio have declined to attend a conference looking to preparation of a new contract with the United Mine Workers, it would be futile to hold such a meeting as provided for of operators of the four states of the Central Competitive Field. Limited production in Indiana, he said, was a direct result of the market being supplied from lower-cost production mines in the non-union fields of West Virginia and Kentucky.

"The contract made by the coal operators and miners of the Central Competitive district in 1920 and effective until March 31, 1922," said Mr. Penna, "was made by the order and under the direction of the President of the United States and approved by the Attorney General, and contains the following provisions, in part:

"'An interstate joint conference shall be held prior to April 1, 1922, the time and place of holding such conference to be determined by a committee of two operators and two miners from each of the four states: Illinois, Indiana, Ohio and western Pennsylvania.'

"There is but one solution to this problem, and that is an equalization in cost of production as between the respective states. The non-union fields must be unionized and obtain wages and conditions better than they have, or the union miners of Indiana and the Central Competitive district must accept less wages. I judge that the operators of the districts which are refusing to go into the interstate joint conference are influenced by the inflexible attitude of the United Mine Workers as shown by their refusal to modify existing agreements in the union fields and their inability to prevent such modifications in the non-union fields."

Men at Brooke County Mine in Panhandle Voluntarily Accept Wage Reduction

WHEN 200 miners resumed work at the Colliers plant of the West Virginia-Pittsburgh Coal Co. in Brooke County, West Virginia, at a reduced wage, it signalized the first break from the union in the northern Panhandle. The men returned to work on the morning of Dec. 30, accepting a 20-per cent reduction in negotiations with the company to which the United Mines Workers was not a party and which were held without regard to that organization. There were some of the miners, however, who declined to accept the reduction. The minimum rate to be paid under the new agreement will be $28 per week. There are two other plants of the same company still in idleness, but if the miners at such plants accept a reduction, operations will be resumed at those plants also. All of the company's plants were closed down several weeks ago when the company found it could not sell coal in competition with non-union producers at wages then paid under union agreement.

Unemployment Increased 4.7 Per Cent in 65 Cities During December

UNEMPLOYMENT throughout the country increased by 4.7 per cent during December, according to the telegraphic survey made monthly by the U. S. Employment Service. The survey covered 1,428 firms located in the 65 principal industrial centers of the country. These concerns were employing 1,493,107 workers on Dec. 31.

Increased employment is shown in textiles, iron and steel, lumber, leather, paper and printing and metals and metal products other than iron and steel. The decreases were mainly in the food industries; liquors and beverages; chemicals; stone, clay and glass products; tobacco manufacture; vehicles for land transportation and railroad repair shops.

Of the 65 cities covered by the survey, 29 report employment increases during December over November, with percentages of increase as follows: Philadelphia, 6 per cent; Milwaukee, 5.8; Dayton, 4.9; Los Angeles, 4.8; Toledo, 4.7; Paterson, 3.7; New Haven, 3.1; Albany-Schenectady, 2.9; Columbus, 2.5; Fall River, 2.4; Niagara Falls, 2.4; Reading, 2.3; Indianapolis, 1.9; Rochester, 1.8; Worcester, 1.7; Chattanooga, 1.6; New Orleans, 1.5; Lowell, 1.5; New York, 1.5; Lawrence, 1.4 Youngstown, 1.3; Manchester, N. H., 1.1; Cincinnati, 0.68; Bayonne, 0.6; Boston, 0.54; Providence, 0.45; Yonkers, 0.37; Birmingham, 0.3; New Bedford, 0.26.

Thirty-six cities reported employment decreases in the following percentages: Detroit, 47.6 per cent; Omaha, 21.2; Peoria, 17.6; Johnstown, 17.3; Sioux City, 15.6; Seattle, 12; Syracuse, 11; Grand Rapids, 10.7; Memphis, 10.5; Baltimore, 10.5; Minneapolis, 9.6; Portland, 6.9; St. Paul, 6.6; Buffalo, 6.1; St. Louis, 6; San Francisco, 5.8; Atlanta, 5.7; Perth Amboy, 4.9; Camden, 4.7; Jersey City, 4.6; Cleveland, 3.8; Waterbury, 3.7; Richmond, 3; Chicago, 2.7; Passaic, 2.5; Pittsburgh, 2; Kansas City, 2; Kansas City, Kan., 1.6; Louisville, 1.4; Denver, 1; Newark, 0.98; Trenton, 0.87; Flint, 0.8; Brockton, 0.4; Bridgeport, 0.3; Springfield, Mass., 0.12.

British Empire Steel Corporation Ordered By Court to Suspend Its Wage Cut

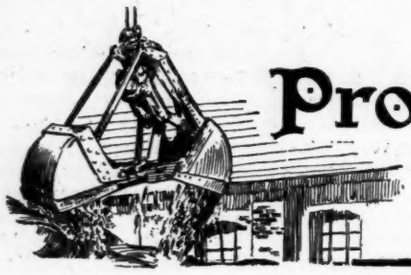
NEGOTIATIONS with the miners in their employ for a readjustment of wages having failed, the British Empire Steel Corporation announced a reduction of wages amounting to about 33 per cent for Jan. 1. The miners, requested by the officials of District 26 of the United Mine Workers, asked the federal Department of Labor to appoint a Board of Conciliation and also petitioned the Supreme Court for an injunction to prevent any cut in wages pending an investigation by the board. On Dec. 31 Judge Russell granted the injunction restraining the Dominion Coal Co., the Nova Scotia Steel & Coal Co. and the Acadia Coal Co., subsidiaries of the British Empire Steel Corporation, from putting the reduction of wages into effect until the matter has been dealt with by the Board of Conciliation. The British Empire Steel Corporation has issued a statement declaring that owing to the action of the court a reduction in the selling price of coal is necessarily deferred, and that general idleness at the Nova Scotia collieries may result.

WALTER E. TRENT HAS SUBMITTED a bid for four of the Shipping Board's large sea-going barges which are to be sold in the near future. Mr. Trent intends to use these barges between Norfolk and his Alexandria (Va.) plant. Coal which has been treated by the Trent process can be sold to greater advantage, it is believed, in Latin America than in the United States. It is Mr. Trent's intention to ship his product to the seaboard by way of the Potomac and to load the barges on the return trip with fuel oil, one of his raw materials. The Shipping Board has purchased six hundred tons of Mr. Trent's "amalgam" and will conduct experiments in its use as a boiler fuel aboard ship.

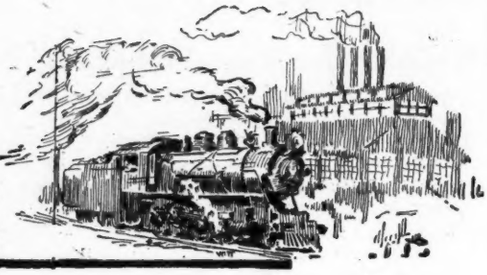
OFFICIAL NOTICE HAS BEEN GIVEN by the railroads declining to put into effect reduced rates on coal to tidewater. This marks the end of a very earnest effort made by the committee, headed by W. V. Hardie, director of traffic of the Interstate Commerce Commission, to bring about a voluntary reduction of export rates as a contribution to the movement looking to the retention of our foreign coal trade.

C. W. STARR HAS BEEN SELECTED by W. D. Brookings, head of the natural resources section of the Chamber of Commerce of the United States, as coal specialist.

THE EXISTING VACANCY on the Finance Committee—the premier committee of the Senate—is likely to be filled by the appointment of Senator Frelinghuysen of New Jersey to that committee.



Production and the Market



Weekly Review

ENCOURAGING signs of improvement have followed the holidays and the dull period which ushered out the old year. Industrials are proceeding cautiously, but consumption is increasing after the holiday dip. Consumers are feeling around for indications upon which to gage their purchases in the first quarter. Inquiries for future delivery are increasing daily, but closings are few, as neither buyer nor seller is inclined to use the present market as a basis upon which to do future business.

Close sales prevail in the spot market and the removal of the freight tax has given the shippers more leeway. Reserves are still adequate, but the buyer is not so inclined to use them for his current needs. The wage controversy is daily being brought to his attention, with the result that requirements are more and more being supplied through spot orders, and the feeling is growing that a cautious policy forbids a further depletion of storage between now and April 1.

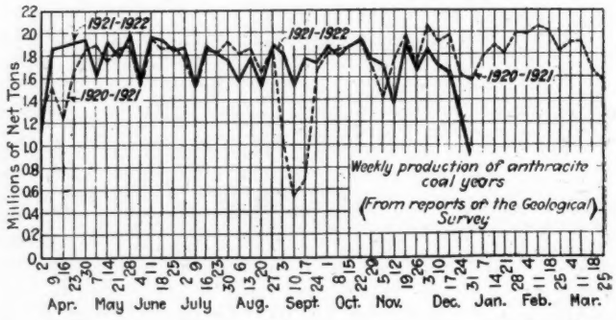
COAL AGE Index stood at 83 on Jan. 9, as compared with 84 on Jan. 2.

Retail distribution has been aided by the colder weather, although household orders are still being held down to current needs. Prices have softened a trifle because of the lower mine quotations and removal of the freight tax. The result is a slightly increased ordering for yard replacement, which promptly checked the advancing fine-coal market, showing how sensitive has been the balance of steam supply and demand.

Liquidation of labor has progressed further this month. The unionized miners seem to have fallen into two classes—those who, because of their poor earnings, are just "plain dissatisfied" with conditions but who evince no willingness to sacrifice the "paper profits" of a higher wage scale, and those who have, or are seeking, a return to better working time on a lower wage basis permitting tonnage to enter the market at the prevailing prices. Progress was made last week in the upper Potomac and Colorado regions toward union wage scale reductions. The men are reported to have broached the subject to their employers.

Colder weather has aided the anthracite industry, although the market is quieter than in recent seasons. Independents are still forced to forego a large portion of their premiums on domestic coal or else remain closed, as retail stocks are too heavy to necessitate much buying of coal at prices higher than company schedule.

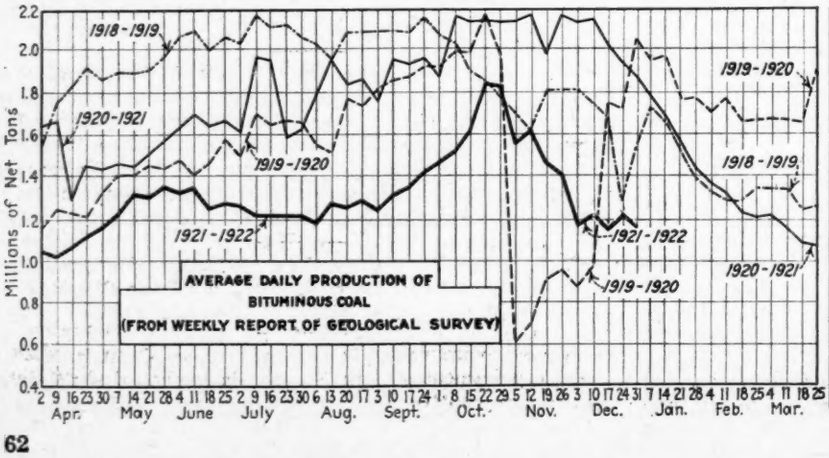
Operating conditions have been aided, as in the bituminous coal industry, by retail price cuts following the removal of the transportation tax on Jan. 1. Steam coals also are in better call.


1921-1922
1920-1921
1921-1922
1920-1921
Millions of Net Tons
Weekly production of anthracite coal years
(From reports of the Geological Survey)
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.

There have been some first-quarter coke contracts closed and prices have been shaded a trifle. The necessary contracting probably is all completed at this time, leaving some operators with tonnage on their hands which they would be glad to tie up for less than going contract figures.

BITUMINOUS

Production during the last week of 1921 was 5,960,000 net tons, as compared with 7,063,000 and 7,450,000 tons for the weeks of Dec. 17 and 24, respectively. The output was held down by the holiday idleness, but the daily average—1,192,000 tons—showed no recovery in demand. The first week of the new year showed that Monday, Jan. 2, was widely observed as a holiday, as loadings on that



Estimates of Production

(Net Tons)

BITUMINOUS COAL

Week Ended	1921	1920
Dec. 17	7,066,000	12,156,000
Dec. 24	7,468,000	9,686,000
Dec. 31 (a)	5,960,000	.....
Daily average	1,192,000	.....
Calendar year (a)	406,990,000	556,516,000
Daily average calendar year	1,326,000	1,805,000

ANTHRACITE

Dec. 17	1,664,000	1,998,000
Dec. 24	1,338,000	1,641,000
Dec. 31 (a)	862,000	1,597,000
Calendar year	87,695,000	88,845,000

COKE

Dec. 24 (b)	117,000	272,000
Dec. 31 (a)	104,000	278,000
Calendar year	5,507,000	20,980,000

(a) Subject to revision. (b) Revised from last report.

day were only one-sixth of normal. However, 27,080 cars were loaded on the following day, the heaviest since Nov. 23, 1921.

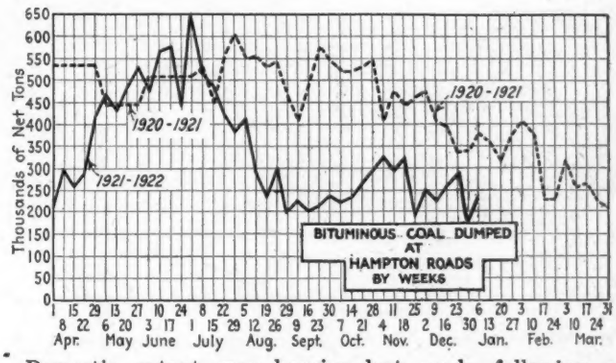
The year's production of bituminous coal is estimated at 406,990,000 tons, the lowest since 1911, when 406,000,000 tons were mined. Records of railroad loadings for November, 1921, show that 36,020,000 net tons were mined, as compared with 43,733,000 tons in October and 35,127,000 tons in September. Cumulative production to Nov. 30, 1921, was 376,000,000 tons.

PRODUCTION OF SOFT COAL, BY GROUPS OF STATES, 1919—1921

(In Net Tons)

Region	First 11 Months of 1921	Year 1921 at Same Rate as 1st 11 Mos.	1920	1919
Northeast (*a*)	223,522,000	241,896,000	331,510,000	300,420,275
Southern Appalachnia (*b*)	15,728,000	17,020,000	23,500,000	20,803,263
Eastern Interior (*c*)	91,210,000	98,707,000	130,800,000	90,407,132
Western Interior (*d*)	17,970,000	19,447,000	29,930,000	21,741,003
Mountain States and Northwest (*e*)	27,622,000	29,893,000	40,680,000	32,381,012
Totals (*f*)	376,052,000	406,963,000	556,420,000	465,752,685

(*a*) Michigan, Pennsylvania, Ohio, West Virginia, Maryland, Eastern Kentucky and Virginia. (*b*) Alabama, Georgia and Tennessee. (*c*) Illinois, Indiana and Western Kentucky. (*d*) Iowa, Kansas, Missouri, Oklahoma, Arkansas and Texas. (*e*) Colorado, New Mexico, Utah, Wyoming, Montana, North Dakota and Washington. (*f*) Alaska, California, Idaho North Carolina, Oregon and South Dakota not included.



Domestic output was heavier last week, following a few days of colder weather, and the resultant production of steam sizes soon caught up with the demand. Screenings are now weaker all around, although this size is moved with no real difficulty. The retailer is buying to replenish the slight drain on his yard stocks, but instead of placing an order for several cars weekly, as was the custom in normal years, he buys each car individually, with closer attention to price rather than quality.

This is especially true of the Midwest, where better

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F. O. B. Mines

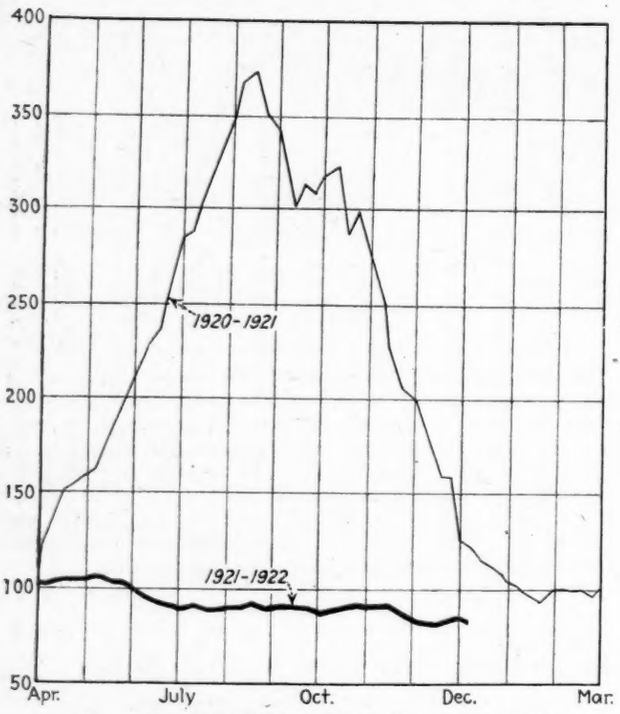
Low-Volatile, Eastern	Market Quoted	Dec. 12 1921	Dec. 26 1921	Jan. 2 1922	Jan. 9 1922†
Pocahontas lump	Columbus	$3.60	$3.55	$3.55	*$3.25@$3.50*
Pocahontas mine run	Columbus	2.20	2.15	2.15	2.00@ 2.25
Pocahontas screenings	Columbus	1.65	1.65	1.65	*1.35@ 1.65*
Pocahontas lump	Chicago	3.10	3.10	3.10	2.50@ 3.75
Pocahontas mine run	Chicago	2.25	2.40	2.50	2.00@ 3.00
Pocahontas lump	Cincinnati	3.25	3.25	3.25	*2.75@ 3.25*
Pocahontas mine run	Cincinnati	2.25	2.10	2.05	*1.85@ 2.00*
Pocahontas screenings	Cincinnati	1.40	1.65	1.55	*1.25*
*Smokeless mine run	Boston	4.80	4.55	4.70	4.60@ 4.75
Clearfield mine run	Boston	1.80	2.05	2.05	1.80@ 2.35
Cambria mine run	Boston	2.35	2.50	2.50	2.25@ 2.70
Somerset mine run	Boston	1.85	1.80	1.80	1.60@ 2.00
Pool 1 (Navy Standard)	New York	3.00	3.05	3.15	2.90@ 3.40
Pool 1 (Navy Standard)	Philadelphia	3.00	3.00	3.00	2.75@ 3.25
Pool 1 (Navy Standard)	Baltimore	2.30	2.35	2.40	**2.50**
Pool 9 (Super. Low Vol.)	New York	2.40	2.30	2.35	*2.10@ 2.25*
Pool 9 (Super. Low Vol.)	Philadelphia	2.35	2.30	2.30	2.10@ 2.50
Pool 9 (Super. Low Vol.)	Baltimore	2.10	2.20	2.20	*2.00@ 2.25*
Pool 10 (H. Gr. Low Vol.)	New York	2.05	2.00	2.10	*1.80@ 2.00*
Pool 10 (H. Gr. Low Vol.)	Philadelphia	2.05	2.00	2.00	1.90@ 2.10
Pool 10 (H. Gr. Low Vol.)	Baltimore	2.00	2.00	2.00	*1.85@ 2.00*
Pool 11 (Low Vol.)	New York	1.80	1.75	1.65	**1.60@ 1.90**
Pool 11 (Low Vol.)	Philadelphia	1.85	1.70	1.70	1.60@ 1.80
Pool 11 (Low Vol.)	Baltimore	1.75	1.85	1.75	1.75
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.55	1.50	1.50	1.40@ 1.60
Pool 54-64 (Gas and St.)	Philadelphia	1.70	1.55	1.55	1.45@ 1.70
Pool 54-64 (Gas and St.)	Baltimore	1.45	1.40	1.45	*1.25@ 1.60*
Pittsburgh Sc'd. gas	Pittsburgh	2.70	2.65	2.65	2.60@ 2.70
Pittsburgh mine run (St.)	Pittsburgh	2.15	2.15	2.15	2.10@ 2.20
Pittsburgh slack (Gas)	Pittsburgh	1.55	1.65	1.80	1.75@ 1.85
Kanawha lump	Columbus	2.90	2.85	2.80	2.65@ 3.00
Kanawha mine run	Columbus	1.85	1.90	1.85	*1.60@ 1.90*
Kanawha screenings	Columbus	1.00	1.15	1.40	*1.20@ 1.35*
Kanawha lump	Cincinnati	2.50	2.90	2.75	*2.35@ 2.50*
Kanawha mine run	Cincinnati	1.50	1.30	1.45	*1.25@ 1.35*
Kanawha screenings	Cincinnati	1.15	1.15	1.25	1.25
Hocking lump	Columbus	3.05	3.05	3.00	*2.75@ 3.00*
Hocking mine run	Columbus	1.95	1.95	1.90	*1.65@ 1.90*
Hocking screenings	Columbus	$1.15	$1.20	$1.40	**$1.35@$1.55**
Pitts. No. 8 lump	Cleveland	3.15	3.00	3.05	*2.75@ 3.00*
Pitts. No. 8 mine run	Cleveland	2.05	1.95	2.00	1.95@ 2.10
Pitts. No. 8 screenings	Cleveland	1.55	1.70	1.95	*1.85@ 1.95*
Midwest					
Franklin, Ill. lump	Chicago	3.80	3.65	3.80	3.50@ 4.05
Franklin, Ill. mine run	Chicago	2.75	2.90	2.90	2.75@ 3.00
Franklin, Ill. screenings	Chicago	1.80	2.10	2.10	*1.75@ 2.25*
Central, Ill. lump	Chicago	3.35	3.10	3.10	2.75@ 3.50
Central, Ill. mine run	Chicago	2.50	2.50	2.50	2.25@ 2.75
Central, Ill. screenings	Chicago	1.70	2.00	1.90	*1.65@ 2.00*
Ind. 4th Vein lump	Chicago	3.35	3.35	3.35	3.00@ 3.75
Ind. 4th Vein mine run	Chicago	2.75	2.70	2.55	2.40@ 2.75
Ind. 4th Vein screenings	Chicago	1.90	1.75	2.10	1.90@ 2.25
Ind. 5th Vein lump	Chicago	2.80	2.95	2.95	2.60@ 3.25
Ind. 5th Vein mine run	Chicago	2.45	2.45	2.25	2.15@ 2.40
Ind. 5th Vein screenings	Chicago	1.55	1.80	1.80	*1.50@ 1.85*
Standard lump	St. Louis	2.80	2.80	2.60	2.50@ 2.75
Standard mine run	St. Louis	1.95	1.90	1.85	1.80@ 1.90
Standard screenings	St. Louis	1.25	1.40	1.65	*1.35@ 1.60*
West. Ky. lump	Louisville	2.75	2.75	2.85	2.75@ 3.00
West. Ky. mine run	Louisville	1.75	1.75	1.90	1.50@ 2.25
West Ky. screenings	Louisville	1.05	1.85	1.65	*1.00@ 1.50*
South and Southwest					
Big Seam lump	Birmingham	3.65	3.65	3.35	2.75@ 4.00
Big Seam mine run	Birmingham	2.00	2.10	2.10	1.90@ 2.30
Big Seam (washed)	Birmingham	2.30	2.15	2.15	2.00@ 2.30
S. E. Ky. lump	Louisville	3.15	2.85	2.85	**3.00@ 3.25**
S. E. Ky. mine run	Louisville	1.75	1.50	1.60	**1.65@ 1.70**
S. E. Ky. screenings	Louisville	1.00	1.45	1.30	**1.25@ 1.45**
S. E. Ky. lump	Cincinnati	3.15	3.15	3.00	*2.75@ 3.00*
S. E. Ky. mine run	Cincinnati	1.55	1.30	1.50	*1.35@ 1.60*
S. E. Ky. screenings	Cincinnati	0.95	1.25	1.20	**1.00@ 1.50**
Kansas lump	Kansas City	5.00	5.00	5.00	5.00
Kansas mine run	Kansas City	4.10	4.10	4.10	4.00@ 4.25
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

*Gross tons, f.o.b. vessel, Hampton Roads.
†Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F. O. B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1921 Independent	Dec. 26, 1921 Company	Jan. 2, 1922† Independent	Jan. 2, 1922† Company	Jan. 9, 1922† Independent	Jan. 9, 1922† Company
Broken	New York	$2.61	.....	$7.60@$7.75	.....	$7.60@$7.75	.....	$7.60@$7.75
Broken	Philadelphia	2.66	$7.50@$7.75	7.75@ 7.85	$6.75@$7.50	7.75@ 7.85	$6.75@$7.50	7.75@ 7.85
Egg	New York	2.61	7.00@ 7.25	7.60@ 7.75	6.50@ 7.00	7.60@ 7.75	**7.25@ 7.50**	7.60@ 7.75
Egg	Philadelphia	2.66	7.00@ 7.25	7.75@ 7.85	7.00@ 7.75	7.75@ 7.85	7.00@ 7.75	*7.75*
Egg	Chicago	5.63	7.40*	6.95*	7.40*	6.95*	7.40*	6.95*
Stove	New York	2.61	8.00@ 8.25	7.90@ 8.10	7.85@ 7.25	7.90@ 8.10	7.85@ 8.25	7.90@ 8.10
Stove	Philadelphia	2.66	8.25@ 8.50	8.05@ 8.25	8.25@ 8.50	8.05@ 8.25	*8.10@ 8.35*	8.05@ 8.25
Stove	Chicago	5.63	7.60*	7.20*	7.60*	7.20*	7.60*	7.20*
Chestnut	New York	2.61	8.00@ 8.25	7.90@ 8.10	7.85@ 8.25	7.90@ 8.10	7.85@ 8.25	7.90@ 8.10
Chestnut	Philadelphia	2.66	8.25@ 8.75	8.05@ 8.25	8.25@ 8.50	8.05@ 8.25	*8.10@ 8.35*	8.05@ 8.25
Chestnut	Chicago	5.63	7.60*	7.20*	7.60*	7.20*	7.60*	7.20*
Pea	New York	2.47	4.50@ 5.00	6.05@ 6.45	4.00@ 5.00	6.05@ 6.45	**4.25@ 5.00**	6.05@ 6.45
Pea	Philadelphia	2.38	4.50@ 5.00	6.15@ 6.25	4.25@ 5.00	6.15@ 6.25	**4.50@ 5.00**	6.15@ 6.25
Pea	Chicago	5.63	6.10*	5.60*	6.10*	5.60*	6.10*	5.60*
Buckwheat No. 1	New York	2.47	2.25@ 2.75	3.50	2.00@ 2.75	3.50	**2.50@ 3.00**	3.50
Buckwheat No. 1	Philadelphia	2.38	2.25@ 3.00	3.50	2.25@ 2.75	3.50	2.25@ 2.75	3.50
Rice	New York	2.47	1.60@ 2.00	2.50	1.50@ 2.25	2.50	**1.75@ 2.25**	2.50
Rice	Philadelphia	2.38	1.75@ 2.00	2.50	1.75@ 2.00	2.50	1.75@ 2.00	2.50
Barley	New York	2.47	1.00@ 1.50	1.50	1.35@ 1.50	1.50	1.35@ 1.50	1.50
Barley	Philadelphia	2.38	1.00@ 1.25	1.50	1.00@ 1.25	1.50	1.00@ 1.25	1.50
Birdseye	New York	2.47	.....	2.50	.....	2.50	.....	2.50

*Net tons, f.o.b. mines.
†Advances over previous week shown in **heavy type**, declines in *italics*.



COAL AGE INDEX 83, WEEK OF JAN. 9, 1922

This diagram shows weekly changes in the spot prices of bituminous coal in the United States as a whole. All prices are reduced to one figure and compared with the average government price of 1918, taken as 100. Actual spot prices for each coal are given in the table in this review.

household buying is noted. The Kansas City market, however, is glutted with Illinois domestic coal, which is being sacrificed to get it off the tracks. The Cincinnati gateway is again becoming clogged with cars on consignment. One reason for this is the heavier operation of southeastern Kentucky mines on the reduced wage scale, and these wrong operating tactics have softened the market in that vicinity.

Prices of coal on the Head-of-the-Lakes docks have been slashed an even dollar to stimulate the movement to the interior. While this has had some effect, the main result was the setback to all-rail competition in the Northwest. Some of the Iron Range mines are showing signs of activity and the seasonably cold weather has helped the domestic market, but steam conditions generally are in lamentable shape.

Business at the Roads has taken on a slightly firmer tone. Dumpings for all accounts were 237,806 net tons during the week ended Jan. 5, as compared with 175,517 tons the previous week. Accumulations at the piers are greatly reduced. Bunkering is more active following the increase in general shipping and last week saw several export cargoes cleared. The destinations, however, were confined to the West Indies and South American ports.

The New England situation is as quiet as ever. Market cargoes are still coming forward, but have been disposed of at slightly better figures. Hampton Roads coals are so low, however, that Pennsylvania grades are unsalable within 100 miles of Boston and all-rail business is now confined to small lots in the narrow zone that cannot be reached via Hampton Roads.

Conditions at Baltimore, New York and Philadelphia are slightly more encouraging. Receipts are small and prices more firmly held, while consumers are more active in seeking tonnage protection for the next 90 days. Actual orders have increased only a trifle.

The comparative ease with which non-union coals secure the bulk of the business that is available makes it more apparent that lower wage scales are vitally necessary to unionized operations. Indiana and Illinois operators have asked for an early conference with the United Mine Workers to discuss this question, while in other sections the question of individual discussions with the various district union officials is under consideration.

ANTHRACITE

The last week of the year saw many anthracite collieries closed and thousands of miners idle. Production was only 862,000 net tons, barely one-half the figure for the corresponding week a year ago. Production after the holidays showed an upturn, following the colder weather.

Domestic demand is rather slow in New England except for the popular sizes. New York and Philadelphia report satisfactory increases in activity and lower retail prices following the removal of the transportation tax. Steam sizes are moving better.

COKE

Beehive coke production was 104,000 net tons during the week ended Dec. 31. The decline of 13,000 tons from the preceding week's figure was caused by the holidays rather than any further slump in demand.

Interest in the coke market centered around the closings for the first quarter, prices on which softened a trifle. One byproduct contract was closed at a very low figure, which hurt the Connellsville market. This low figure was not on account of beehive competition but to enable the furnace to blow in. The seller loses on the coke but gains in the make of byproducts and has the privilege of withdrawing the tonnage should he need it for his own furnaces.

Foreign Market And Export News

Russia Owes Shipping Board for Coal

The Senate Judiciary Committee has published correspondence relating to loans to foreign countries by the United States, in which reference is made to coal. In requesting a loan of $48,000,000 the Greek Minister pointed out that Greece depends on the United States for coal.

A statement was given showing that Russia owed the Shipping Board the following amounts for coal: coal on delivery June 21, 1917, $1,040; coal on delivery to Publishers Paper Co., Nov. 22, 1917, $4,455; coal consumed by vessel during off-hire, $1,375; coal on delivery June 20, 1917, to June 15, 1918, $1,034; coal on re-delivery, $4,620; coal on delivery May 26, 1917, to Jan. 23, 1918, $2,607; coal on re-delivery, $3,608; coal on delivery July 7, 1917 to March 9, 1918, $1,386; coal on re-delivery and off-hire, $2,563; coal on board on delivery July 28, 1917, to May 28, 1918, $1,639; coal on re-delivery and off-hire, $1,996; coal on re-delivery May 7, 1917, to Feb. 7, 1918, $594.

Coal Paragraphs from Foreign Lands

CHILE—A corporation has been organized in Valparaiso, called the Compania Minera e Industrial de Chile, as stated by *Commerce Reports*. It is expected that the capital will be raised to 500,000,000 paper pesos, with which the entire property of the Lota & Coronel Coal Co., the largest of its kind in Chile, will be acquired. Directors and stockholders of the new company are practically the same as those of the Lota and of the Schwager Coal companies. If this plan is accomplished it will result in almost complete control of the coal industry in Chile.

ITALY—The price of Cardiff steam firsts is quoted at 38s. 3d. on the Genoa market, acording to a cable to COAL AGE. On Jan. 1, the price was 38s.

EGYPT—For the nine months ended Sept. 30, 1921, coal imports were 698,028 tons, of which 362,583 tons came from the United States and 213,335 from the United Kingdom. The position enjoyed by the American shippers, however, has been reversed by the reentry of British competition, following the approach to normal of that industry.

British Railways Cut Rates to Help Coal Trade

Reduction, 25 Per Cent, Not Thought Sufficient to Restore Competition—Production Registers Slight Decline—Prices Show Marked Decline from a Year Ago

BRITISH production for the week ended Dec. 24 was 4,965,000 gross tons, according to a cable to COAL AGE. This is a slight decline from the preceding week's figure, when 5,027,000 tons were mined. Export markets are not quite so active but severe weather is hampering loadings, increasing congestion.

English and Welsh railway companies on Jan. 1 reduced carrying charges for coal, iron, steel and limestone for iron and steel works. Though the concessions are not as large as those asked, the reduction in railway revenue will be around £10,000,000 per year.

The 1921 rate for carrying coal, coke and patent fuel was the January, 1914, basis plus 100 per cent. This was cut to 75 per cent and is to be applied experimentally for twelve months.

The feeling in the South Wales coal trade is that the present charges can afford no marked assistance to the competitive position of the industry and that reduction of dock dues and a return to the three-shift working of coal trimmers and tippers remain the essentials for the restoration of the export trade.

The railways are aware that these reductions are less than those which were stated to be necessary in order to afford the desired relief to trade, but, on the other hand, they cannot afford to make further concessions. Before such concessions are made there must be a fall in the price of coal and other materials and railway wages, and working conditions should be brought into more harmony with the industrial position.

The average price of steam coal in November was 25s. per ton, against 115s. in November, 1920. Household coal was 34.5s., against 37.5s., and bunkers 16s. compared with 74s. Gas coal in November was 22.85s., against 96.65s in the same month of 1920. Since January, 1921, the price of coal has been reduced by an average of 13s. 6d.

Large steam coal exported from Cardiff during November was 30s. 11d. against 32s. 8d. in October, steam smalls were 17s. 2d. against 16s. 8d.; large steam from Swansea was 28s. 10d. against 36s. 11d., and smalls remained the same at 16s. 7d.

Best Admiralty large coal is softer at 24s. 9d. Other quotations, cabled to COAL AGE show a lower range.

Return Cargoes of Ore May Revive French Market for American Coal

The possibilities of French iron ore coming to this country in return for American cargoes of coal have been put forward by a French concern with an output of 350,000 tons of ore a year. The company consumes about 250,000 tons of coal a year, and, in 1920, imported some American coal that gave excellent results, equaling the best English and Welsh product and proving superior to the German coal. American fuel, however, cannot be imported now on account of cost of transportation.

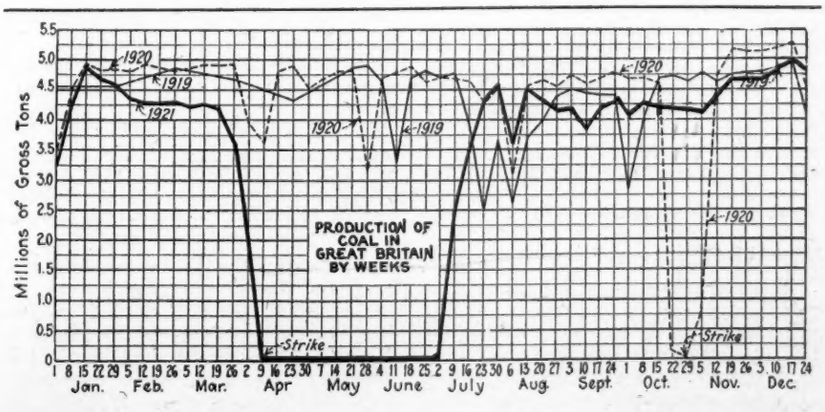
American coal, c.i.f. St. Nazaire, where the company is located, is at present about 135 fr., while English coal can be landed for 85fr.@90fr. If return cargoes were found for American vessels, however, the transportation charges could be reduced so as to enable American exporters to compete.

Hampton Roads Bunkerage Increases

Actual movement of coal showed but little increase last week. Prospects, however, are better. Bunker business, particularly, is holding its own, but New England shipments are dull. Some movement of foreign cargoes was evident during the week, although all shipments went to the West Indies or to South American ports.

Official figures for 1921 show that approximately 15,000,000 tons went over the piers at Hampton Roads, an increase of approximately 2,000,000 tons over the previous year. The belief in the trade is that the 1921 figures will not be exceeded this year.

Accumulations at Tidewater may soon be materially increased, many mines having resumed operations after the holiday shut-down. A strong movement of fuel to New England is expected to take place within the next month or six weeks, and with a steady increase in general shipping the bunker business promises to receive its share.


Millions of Gross Tons
PRODUCTION OF COAL IN GREAT BRITAIN BY WEEKS
1920
1919
1921
Strike
Jan. Feb. Mar. Apr May June July Aug. Sept. Oct. Nov. Dec.

Pier and Bunker Prices, Gross Tons

Foreign Bunker Quotations by Cable to Coal Age

	Dec. 31,	Jan. 7†
PIERS		
Pool 9 New York	$5.40@$5.60	$5.50@$5.65
Pool 10, New York	5.10@ 5.30	5.20@ 5.35
Pool 9, Philadelphia	5.50	5.50
Pool 10, Philadelphia	5.00@ 5.40	5.10@ 5.40
Pool 71, Philadelphia	5.50@ 5.75	5.50@ 5.75
Pool 1, Hamp. Rds	4.50@ 4.70	4.65@ 4.75
Pools 5-6-7 Hamp. Rds	4.25	4.25
Pool 2, Hamp. Rds	4.50	4.50@ 4.60
BUNKERS		
Pool 9, New York	5.70@ 5.90	5.80@ 5.95
Pool 10, New York	5.40@ 5.60	5.50@ 5.65
Pool 9, Philadelphia	5.50@ 5.85	5.60@ 5.85
Pool 10, Philadelphia	5.35@ 5.50	5.40@ 5.50
Pool 1, Hamp. Rds	4.80	4.75@ 4.85
Pool 2, Hamp. Rds	4.60	4.60@ 4.70
Welsh, Gibraltar	40s. f.o.b.	40s. f.o.b.
Welsh, Rio de Janeiro	65s. f.o.b.	65s. f.o.b.
Welsh, Lisbon	45s. f.o.b.	45s. f.o.b.
Welsh, La Plata	62s. 6d. f.o.b.	62s. 6d. f.o.b.
Welsh, Marseilles	125 fr. f.o.b.	125 fr. f.o.b.
Welsh, Genoa	40s. t.i.b.	40s. t.i.b.
Welsh, Madeira	42s. 6d. f.a.s.	42s. 6d. f.a.s.
Welsh, Teneriffe	42s. 6d. f.a.s.	42s. 6d. f.a.s.
Welsh, Malta	45s. f.o.b.	45s. f.o.b.
Welsh, St. Michaels	60s. t.i.b.	60s. t.i.b.
Welsh, Las Palmas	42s. 6d. f.a.s.	42s. 6d. f.a.s.
Port Said	51s. 6d. f.o.b.	51s. 6d. f.o.b.
Belgian, Antwerp	40s. f.o.b.	32s. 6d
Alexandria	42s.	42s.
Bombay	38 rupees	38 rupees
Capetown	42s. 6d.	42s. 6d.

C.I.F. Prices, American Coal

(In Gross Tons)

	Dec. 31 Low Vol.	Dec. 31 High Vol.	Jan. 7† Low Vol.	Jan. 7† High Vol.
French Atlantic	$8.60	$8.80	*$8.55*	*$8.80*
West Italy	8.70	8.85	*8.60*	*8.75*
Scandinavia	....	....	8.85	8.95
Havana	6.50	6.75	....	....
The Plate	8.75		8.90	

These quotations are purely nominal and as far as can be learned, no business is being done in these markets.

Current Quotations British Coal f.o.b. Port, Gross Tons

Cardiff:	Dec. 31	†Jan. 7†
Admiralty, Large	26s.	*24s. 6d.@25s.*
Steam, Smalls	19s.	*18s. 6d.@19s.*
Newcastle:		
Best Steams	23s. 9d.	*23s. 6d.*
Best Gas	21s. 9d.	21s. 6d.@22s.
Best Bunkers	21s. 6d.	*21s.@21s. 6d.*

† Advance over previous week shown in **heavy type** declines in *italics.*

Export Clearances, Week Ended Jan. 5, 1922

FROM HAMPTON ROADS:

	Tons
For Atlantic Islands:	
Du. S.S. Maashaven, for Port of Spain	3,081
For Chile:	
Am. S.S. Argosy, for Pisagua	1,067
For Cuba:	
Am. S.S. Ozama, for Havana	2,570
Dan. S. S. Viborg for Havana	2,890
For Canada:	
Br. Schr. Seaman A. O., for St. Johns, N. B.	692
For India:	
Br. S. S. Kabinga, for Singapore	1,792
Am. Schr. Guilford D. Pendleton, for St. Thomas	2,163

FROM PHILADELPHIA:

For Brazil:	
Nor. S.S. Margit Skogland, for Rio de Janeiro	——
For Nova Scotia:	
Br. Schr. Madelyn E. Hebb, for Lunenberg	——

Hampton Roads Pier Situation

	Week Ended Dec. 29	Week Ended Jan. 5
N. & W. Piers—Lamberts Point:		
Cars on hand	1,757	1,103
Tons on hand	97,718	66,424
Tons dumped	72,684	94,234
Tonnage waiting	2,300	2,800
Virginian Ry. Piers—Sewalls Point:		
Cars on hand	922	926
Tons on hand	62,500	51,400
Tons dumped	50,033	73,293
Tonnage waiting	19,435	10,418
C. & O. Piers—Newport News:		
Cars on hand	864	616
Tons on hand	43,200	30,800
Tons dumped	33,995	44,800
Tonnage waiting	1,537	——

Export Markets Return to British

A comparison of the overseas coal trade of the United States and of the United Kingdom has been made by F. R. Wadleigh of the Department of Commerce. His compilation is as follows:

OVERSEAS EXPORTS OF BITUMINOUS COAL IN GROSS TONS

	United States	United Kingdom
1913	4,101,658	73,400,118
1914	4,232,569	59,039,880
1915	5,987,892	43,534,771
1916	6,941,352	38,350,553
1917	4,923,404	34,995,787
1918	3,764,645	31,752,904
1919	7,187,345	35,249,568
1920	19,695,790	24,931,853
1921 (11 mo.)	8,377,749	20,351,390
1921		
July	1,326,517	816,132
August	362,399	3,103,207
September	163,106	3,406,579
October	195,209	3,405,792
November	179,413	3,593,864

The figures for the United States, 1913, 1914 and 1915 are fiscal years ended June 30. The others are calendar years.

Destination of British Coal Exports, November, 1913, 1920, and 1921

Country	Quantity (Tons) — November		
	1913	1920	1921
Russia	379,347	6,728	26,691
Sweden	404,540	47,357	190,296
Norway	207,766	20,757	85,604
Denmark	244,970	35,041	185,238
Germany	677,074	.....	99,610
Netherlands	157,610	15,554	237,827
Belgium	162,091	7,471	119,099
France	1,031,427	744,521	1,033,986
Portugal	89,872	38,463	51,021
Azores and Madeira	11,852	.....	.....
Spain	200,338	30,795	111,779
Canary Islands	80,411	.....	34,600
Italy	784,135	183,364	497,067
Austria-Hungary	78,066	1,410	.....
Greece	75,573	.....	19,984
Algeria	113,832	15,730	54,213
French West Africa	7,391	7,317	4,402
Portuguese W. Africa	12,838	4,522	13,677
Chile	49,052	9	8,065
Brazil	137,971	6,264	52,285
Uruguay	56,039	.....	37,459
Argentine Republic	290,262	10,629	94,137
Channel Islands	16,667	9,244	14,471
Gibraltar	40,897	70,730	42,756
Malta	73,060	18,306	13,946
Egypt	315,300	42,908	221,936
Anglo-Egyptian Sudan	.....	.....	162
Aden and Depend.	5,981	.....	4,495
British India	11,955	14	104,086
Ceylon	15,420	.....	23,361
Other Countries	181,667	43,590	211,611
Total	5,913,404	1,360,724	3,593,864

United States November Exports of Coal and Coke, by Customs Districts

Customs Districts	Anthracite	Bituminous (Gross Tons)	Coke
Maine and N. H.	24	75	56
Vermont	3,704	647	204
Massachusetts	75	12,325	.....
St. Lawrence	90,570	132,374	2,944
Rochester	22,959	24,877	21
Buffalo	184,541	226,673	8,185
New York	11,198	719	3
Philadelphia	5,824	14,948	495
Maryland	.....	36,671	3,567
Virginia	.....	111,451	.....
South Carolina	.....	8,458	.....
Florida	.....	5	93
Mobile	.....	1,764	.....
New Orleans	.....	1,865	4
San Antonio	306	215	2,362
El Paso	70	5,472	720
San Diego	11	5	.....
Arizona	277	1,751	.....
Los Angeles	.....	6	.....
San Francisco	.....	.....	6
Washington	291	2,199	.....
Dakota	6,783	5,817	1,670
Duluth and Superior	2,452	5,727	197
Michigan	290	118,196	8,630
Ohio	5	366,527	1,190
Total	329,380	1,078,767	30,347

Reports From the Market Centers

New England

BOSTON

Market Very Quiet—Buyers Show Little Interest — Prices More Stable — Coastwise Freights Easy — All-Rail Territory Narrows — Anthracite Dull.

Bituminous—The market continues extremely dull. There is a certain tonnage being observed from week to week by small users, but the aggregate is not large and for the most part is restricted to Hampton Roads coals on cars at re-handling points like Boston and Providence. There is scattering business also on rail coal in the Western part of this territory but movement in that direction also continues light.

Reserves are being depleted only very slowly and buyers are quite indifferent to current offerings. For those who keep in touch with the market there is every inducement to withhold purchases until as nearly as possible the last moment. "Market cargoes" still come forward, and while there is less forcing on the part of the agencies there are enough low prices made on tail-ends to keep prominently before buyers the generally ragged state of the market. Less than $6 has been taken on cars Boston for Hampton Roads coal and on any such basis there is of course no chance whatever within 100 miles of Boston for Pennsylvania grades. The latter seem to be confined to small requisitions in the narrow zone that is now safely all-rail.

Reports from the loading piers show much less coal standing at the Roads. The trade judges from this that smokeless operators are mining for the most part only on orders and in sections where there have been agreements to pay less wages than the union scale that is still officially in effect. Spot prices f.o.b. Norfolk and Newport News are somewhat firmer on a basis not far from $4.75 per gross ton. It all tends to show that mine-owners are less inclined to produce at a loss than was the case during the summer. Now that cost figures are available for the whole of 1921 most of the mining interests are expected to adopt a close-hauled policy with respect to spot business.

In all quarters quotations seem to have settled into grooves. There is less fluctuation and it is quite apparent that offers are individual; they rest more upon special local conditions in the mining districts than on any general market level. At the Philadelphia and New York piers there is almost nothing doing on the Pennsylvania grades. While on these coals the water route figures less than all-rail, yet Pocahontas and New River via Hampton Roads figure still so much less, because of a lower f.o.b. mine basis, that the latter naturally have the call.

Anthracite—The trade shows no sign of improvement. Retail business is still light, although a few seasonable days have helped the dealers somewhat in reducing their large stocks. Independent shippers are offering egg and pea at very material cuts, as compared with company circulars, but it does not appear that such a policy helps very much in moving coal in this kind of market. The publicity of it only reacts unfavorably on the retail trade.

Tidewater—East

NEW YORK

Retail Prices Are Cut—Surplus Stocks at Local Piers Reduced—Bituminous Market Firmer—Suspension of Mining Helps Situation — Movement Menaced by Harbor Strike.

Anthracite—The suspension of operations in many mines over the holidays and several days of good coal consuming weather helped the anthracite industry. Retail dealers put in a busy week or ten days and this activity is now being felt in the wholesale market.

While the piers are not blocked with coal as before the holiday season stocks are still large. Some companies it was said had loaded several idle boats in order to save car charges.

Egg coal, which has been one of the stumbling blocks, is now active. Apartment house owners are refilling their bins. There is a fairly good movement in stove and chestnut but not in pea.

The cleaning up of considerable surplus coal at the docks caused a firmness in independent quotations. Pressure on the steam coals was much easier. Demand was strongest for barley. The better grades brought company circular. Buckwheat and rice were not so active.

Bituminous—There is a little more activity now that stocks on local piers are shortening. This market is in a much healthier condition. There is less coal here than at any time in more than a year. Near the end of the past week there were only about 800 cars at the piers.

Inquiries are again on the increase but little actual business is reported. Large consumers were not likely to make contracts at present prices and when they do, those contracts will provide that the buyer will get the benefit of any reduction in wage cuts. One large house was quoting on a basis of $3.20 f.o.b. mine, with the wage provision.

The strike of the harbor boatmen inaugurated the last of the week has not lasted sufficient time to have any effect on the market. It was said that nearly 500 men quit work in protest against the cut in pay offered by the boatowners. The lack of demand, however, and the few tugs and boats necessary to move the coal needed, resulted in small inconvenience to the trade.

Average quotations showed slight increases in most coal. While the war tax was elminated on Jan. 1, there was

considerable coal at the piers or on the way from the mines on which the tax had already been paid.

A reduction of approximately 25c. per ton was announced on Jan. 2 in the retail price of the domestic sizes in Manhattan and Brooklyn. The delivery prices in Manhattan do not include labor which those for Brooklyn include putting the domestic coals in bins. The schedule of prices follow:

	Manhattan	Brooklyn
Broken	$12.85	$12.90
Egg	12.85	12.90
Stove	13.10	13.15
Chestnut	13.10	13.15
Pea	10.75	10.90
Buckwheat	7.65	7.80
Rice	6.75	6.80
Barley	5.75	5.80
Bituminous	8.00	7.65

BUFFALO

Demand Not Improving—Both Bituminous and Anthracite Slow — Large Amounts of Anthracite on Track.

Bituminous—Demand is rather less than it was, but that was expected, for consumption during the holidays was light and the consumer is not stocking up, mainly because his storage space is full of coal bought at his own price.

Many operators looking into the future, say they will not pay the check-off and wages must drop to the 1917 scale. As a rule their mines are idle. Quotations of bituminous continue at $2.75 for Youghiogheny lump, $2.50 for Pittsburgh and No. 8 lump, $2.25 for Allegheny Valley and all mine run, and $2.50@$2.70 for slack.

Anthracite—Members of this trade find it about as dull as bituminous. Reports from the mining districts tell of the thousands of cars that are standing on tracks because the demand has been smaller than was estimated. Some of the coal has been sold at sacrifice prices, something that has not happened in that trade in a long time, if ever. During most winters of late the demand was close up to capacity output and often Buffalo has had to be given an extra allotment to satisfy the clamor and stave off what threatened to be a panic. Now the demand is seldom good more than one day at a time.

PHILADELPHIA

Independent Anthracite Prices Drop—Much Retail Price Cutting—Only Stove and Nut in Demand—Companies Store Coal—Steam Sizes in Moderate Call—Bituminous Quiet—Market Prices Firm.

Anthracite — The year opened with the independent operators generally reducing prices to company level on stove and nut and frequently below on egg and pea. On the two most desired sizes, stove and nut, $8.10 are the most frequently quoted independent prices, while on egg quite a number are making sales at $7.60, and on pea all are below the company circular, $5.50 being the ruling figure.

On top of the price reductions by independents, the leading retailers made a 25c. reduction to the consumer, with prices as follows: Egg $14, stove and nut $14.25, and pea, $11. However, numerous prices much lower than these have been prevalent for several weeks all over the city.

Steam coals are in moderate demand only, with buckwheat and barley in best call.

Bituminous—The first week of the new year has passed and the hoped-for increase in buying has not developed. It is true there are and have been numerous inquiries for prices, but only light business has developed. There is nothing new in the industrial situation, as the principal factor—the iron trade—makes no appreciable advance in this district, there being as many curtailments as reports of increased activity.

As usual there have been coal contracts expiring the first of the year, although not as many as ordinarily, but it has been difficult for producers to negotiate new agreements. The consumer is convinced that it is more economical to buy in the open market. Under present operating conditions it is extremely difficult for the producer to arrive at a contract price and for this and the above reason there has been an extremely light tonnage entered into.

Prices are far from strong, but manage to hover around the low levels of the past few weeks. Of course the best qualities are in the strongest demand, but even among them there is no real activity.

BALTIMORE

General Business Conditions Are More Encouraging—Fuel Purchases Increase —Prices Continue Weak—Hard Coal Demand Only Medium.

Bituminous—Inquiry in mercantile and manufacturing circles generally brings the information that business is improving surely, if slowly. A little better demand is noted also in line trading for coal, but the fuel men here feel that this is due in most part to the fact that many industries are laying in stocks of even moderate size in order to prevent this being placed against their 1921 inventories. This purchasing after all is but a form of delayed buying.

The price basis at present in the keen business competition that is taking place is far from satisfactory. While the ordinary run of the market is above some of the individual selling by considerable figures, it is noteworthy that some Pool 71 coal exchanged hands here the past week as low as $2 a net ton f.o.b. mines.

The harbor situation has been none too active since the first of January. The only movement credited to export is two schooners loaded for Porto Rico with a total of 1,899 tons, and two steamers loaded for Boston.

Anthracite—The situation drags on without particular interest. No move has been made as yet for a retail price reduction as a result of the removal of the tax on freight. Local dealers have felt that the margin of profit here has been none too favorable, no effort having been made to make a winter advance as was done in many former years.

Northwest

MILWAUKEE

Cold Wave Stimulates Buying in Both City and Country — Rush of Orders Reveals Slim Supplies in Consumers' Bins—Storage Fires Do Some Damage.

Uncertain weather and reports of cold waves in portions of the East and West brought about a rush of orders to Milwaukee coal dealers. City deliveries and rail shipments are now on a winter basis as far as anthracite and domestic grades of bituminous coal are concerned. City orders reveal the insufficiency of supplies laid in by consumers. Orders continue small in quantity, however. Steam coal is in poor demand.

The new year brought no changes in prices of coal or coke.

A new crop of damaged soft coal screenings will probably be forced upon the market as a result of a fierce wind storm which fanned smouldering fires in soft coal piles along the Menomonee River. It is estimated that fires of this nature in the coal district have inflicted more than $100,000 damage in the last two years.

DULUTH

Price Drops All Around—More Reductions May Be Coming—Iron Mines Begin Buying Again.

The first price cut of the season occurred in hard coal with the opening of the new year. A general reduction of 20c. all around has been announced by dock men and retail prices have also been cut. Many coal men look upon this as the first indication of a weaker market with more and greater cuts to come soon. Others contend that the cut as announced will bring the desired results and that coal will move.

Prices from the docks on anthracite now are, egg, $12.55; stove and nut, $12.80; pea, $11; buckwheat, $6.

The cut in soft coal last week averaging $1 has been passed on by the retailers to the consumer, changing retail prices at the Head-of-the-Lakes materially. Pocahontas lump is now selling to the consumer at $11.50, with about a $2 drop for mine run, and Youghiogheny, Hocking, and Splint are selling at $8.50 for lump and $8 for run of pile. Steam screenings are sold at $5 retail leaving only a margin of $1 between the retail and wholesale prices.

Shipments have dropped off in the main during the last week, due to another spell of mild weather, but an increased demand has appeared in the last day or two for screenings. Dock companies have received orders from two mines on the iron range which are starting operations.

MINNEAPOLIS

Market Absolutely Refuses To Quicken —Rail Tonnage Reduces—Dock Business Steadily Lessens.

There is seemingly no hope for the coal trade to profit this winter. The only thing that could be asked as a business-maker, would be an old-fashioned blizzard with roads tied up.

Everything else that formerly developed an active coal demand has come and gone with but little effect.

There have even been reductions in various grades of coal though jobbers insist soft coal from Eastern mines is now sold at less than cost. Even hard coal, whose list prices are supposed to be a close second to the laws of the Medes and Persians, is quoted 15c. lower by two local concerns.

The tonnage moving from the docks to the interior is less than the average even though it picks up now and then and comparative figures for certain periods may show a little gain over former years. And in view of the reduced tonnage of all-rail coal to this district, the dock business should show a gain. The fact remains that business continues to be curtailed. The domestic trade is running closer and economizing more. The steam trade is doing everything possible to keep consumption down.

The Northwest will be actively using coal for heating purposes for three or four months yet. But the active period will fall away in about two months. And industrially there has been no material change for the better. Of late, some shops and plants which were closed for a fortnight or so over the holidays, have been resuming. Some local railroad shops are reported to be due for increased activity. But as production in many lines has been at a low ebb for a long time, there is room for a considerable increase in this direction before things are at all lively.

Inland West

DETROIT

Little Demand for Either Steam or Domestic Sizes of Bituminous—Receipts Light — Most Shipments Come from West Virginia Unorganized Districts.

Bituminous—Sales of bituminous coal are still light. Neither steam nor domestic sizes are arousing any interest. Consumers of steam coal are buying small quantities spasmodically. Though some of the steam plants are taking coal only when the opportunity arises to pick up a bargain, nearly all are reported to have accumulated a supply in excess of present needs.

The movement of coal into Detroit is light. Jobbers say that the greater proportion of the shipments now coming this way are from the unorganized districts of West Virginia and that because of their advantageous position in the matter of costs, the number of mines in union districts, offering competition is steadily decreasing.

West Virginia 4-in. lump is quoted at $3 a ton, 2-in. lump, $2.50, egg $2.25, mine run $1.75, and slack $1.25. Ohio 3-in. lump is $3, egg $2.25, mine run $2, and slack $1.50. Pittsburgh No. 8, 1¼-in. is $2.35, ¾-in. lump $2.25, mine run $2, and slack $1.75. Smokeless lump and egg is $3.50, mine run $2.25, slack $1.75.

Anthracite—Buying of anthracite by household consumers is not measuring up to expectations of retailers, who still have heavy stocks.

CLEVELAND

Industrial Demand Still Depressed—Improvement Expected Soon—Markets Dull Save Slack—Retail Trade Quiet.

Demand from railroads and public utilities continues to supply the main support of the coal market. Industrial consumption is exceedingly low, but the next few weeks is expected to see some improvement due to the fact that some plants are planning to resume operations. The record of employment for Cleveland in December, showing a decrease of 3.8 per cent during the month, tells the story of the slackened fuel demand.

In the automobile and accessory plants alone the decrease was 19 per cent. In the steel industry there were 9 per cent fewer employees on the payrolls than one month before. These figures are significant inasmuch as these two groups of industry comprise the most important activities in this district.

In the steel industry the outlook is especially good. In July operations stood at 18 per cent of capacity. They advanced to 50 per cent by November, and dropped to 40 per cent in December. Improvement is already beginning and it is expected to continue gradually until average operations reach from 60 to 75 per cent by late spring. The extent to which industrial improvement goes will control the degree of expansion in the coal market over the next few months.

A coal strike of course would disturb the whole situation. Some operators still believe that a strike is inevitable, but hope has not been abandoned that a settlement will be reached.

The continued suspension of mine operations is causing further strength in screenings. Steam slack is now quoted at $2 f.o.b. mines. This is the highest price for this grade in some months. Contract negotiations are virtually absent as both operators and consumers are unwilling to enter into future agreements on the present basis of prices.

Bituminous coal receipts for the week ended Dec. 31 show a decrease of 148 cars. Total was 964 cars; divided, industrial 693, retail 271.

CINCINNATI

Mild Weather and Renewed Mining Soften the Market—One Jobber Starts Break in Domestic Prices — Retailers Juggle Quotations.

Mild weather and the resumption of many mines in the nearby producing territory have softened the market again. The smokeless mines are reported to be working 10 per cent higher this week. Many mines in the New River district are also coming in while southeastern Kentucky is working back to the mark set before the Christmas shutdown occurred.

Another break in the price of domestic coals came because of weather conditions and the activities of one of the Cincinnati wholesalers. Southeastern Kentucky coals were offered at $2.50 for lump and before the price was a week old most of the other selling mediums as well as the mines had met the price. Bituminous slack still held above the dollar-mark but it was expected that this would be knocked a cropper as soon as the cars start to stall at the weighing yards and points of distribution. Smokeless is firm. January circulars show $3.25 asked for lump and egg but sales are all the way to fifty cents lower.

One large firm of retailers "shot the market" here recently. In flaring advertisements it announced smokeless lump at $8, a reduction of $1.50. Mine run was offered at $6.50 and slack at $5.50. The concern also offered bituminous at $6.50 for lump and $6 for mine run and slack at $4.50. These prices are 50c.@$1 below that being asked by other retailers. Those who were offering bituminous slack at $4 have raised the price to $4.50 for the reason that they "are out of their original supply."

COLUMBUS

Cold Weather Wakens Domestic Demand—Drop in Lake Prices Has a Spreading Effect—Production Ranges From 17 to 40 Per Cent.

A slight increase in domestic demand has developed because of colder weather. Steam trade is still slow. Lake prices have dropped under the influence of competition.

Household orders, as a rule, are small because of the fact that most of the frugal householders have put in their winter's supply. Retail prices have stiffened under the influence of better buying but no marked advances have been recorded.

Hocking lump is selling around $6@$6.50 delivered while West Virginia splints sell at $6.75@$7.25. Pocahontas is weakening and is sold at $8.25@$9 while anthracite is selling around $14.50. Retail stocks are still fairly good, for dealers had extra large stocks following the threat of a rail strike.

The steam trade is slow. A few manufacturers are resuming operations following the holiday period and consumption is increasing slightly. Reserve stocks are still large and this mitigates against a more active demand. Railroads are buying only current needs. Because of curtailment in lump production, screenings are stronger and prices range around $1.50. This is causing many plants, which have crushers to buy mine run as the price is not much higher than for slack. Public utilities are the best steam customers at this time.

ST. LOUIS

Weather Eases Demand on Steam and Domestic—Surplus of All Kinds Exists —Public Waits for Prices to Break.

The situation is typical of midwest conditions. Only the cheapest kinds of coal are moving and even those in small lots. Warm weather setting in after the first of the year brought things to a standstill. No general buying movement has yet materialized.

The little domestic that is moving is mostly Standard. It is in scattered lots. Mt. Olive is moving to some extent but Carterville is slow and anthracite and

smokeless are dead. There is a little activity in coke but not enough to meet expectations.

Steam in the city is easy. A little call for screenings in carloads has developed. Other than that things are far below normal at this season.

MIDWEST REVIEW

Heavier Domestic Production Softens Screenings—Some Buying for Reserve—Early Conference Sought with U. M. W.—Necessity for Lower Costs.

The first week of the new year saw no improvement in the coal market. Demand for domestic coals continued but little better than sluggish, while steam coals are still selling below cost.

Owing to some seasonably cold weather there has been a little better demand for domestic coal. This is especially true of portions of Iowa, Minnesota and North and South Dakota. Retailers, however, are hanging back and refusing to place business, on the ground that the public is refusing to buy. The average retailer very strongly believes that it will be a week or so now before freight rates are reduced, and he adheres to this idea in spite of all information to the contrary.

What little domestic coal is purchased is being bought only in a hand-to-mouth manner. Two or three years ago in the winter months the dealer would place an order calling for three, four and five cars a week to continue for the winter months, whereas this year he is only buying one car at a time and haggling long and carefully over the price of each individual shipment. When he does buy he is influenced often by a cut price rather than by quality.

The market on steam coals, especially screenings, is a little easier this week, principally because some mines worked and produced coal to take care of the demand from the country for domestic sizes. Indiana screenings, in some cases, can be bought as low as $1.50, but perhaps the average price for the whole territory would be in the vicinity of $1.75@$1.80.

Middle West operators are now thoroughly aroused to the danger of competition from non-union mines in the East, and operators recently took their first steps in a campaign to put their selling prices more in line with competition they are encountering from the East. One of the operators' associations, representing practically all of Illinois' tonnage, sent a telegram to Mr. Lewis, president of the United Mine Workers, requesting that an early conference be called for the purpose of talking over wage reductions and the abolition of the check-off system. Until wages are reduced and the check-off abolished, Indiana and Illinois operators will be at a great disadvantage and can look forward to the prospect of seeing their own logical territory invaded by cheaper Eastern coals and their customers taken away from them.

The situation has developed into this: The check-off will have to be abolished and wages will have to be reduced in Illinois and Indiana, or the non-union fields in Kentucky and West Virginia will have to be unionized.

West

DENVER

Pueblo Steel Mills Reopen—1922 Outlook Puzzling—Bituminous and Lignite Prices Are $1 to $2 Under 1921—Wages Going Down.

Reopening of the steel mill at Pueblo has stimulated mining a little. They consume about 2,000 tons daily. The old year closed with a decrease of about 2,500,000 tons over 1920. Uncertainty over freight rates, coal miners' wage demands and a lack of industrial development make the new year outlook puzzling.

Bituminous lump is retailing for $1 less than last year, and lignite lump is $1@$2 less.

Twelve of the thirteen operating mines of the Colorado Fuel and Iron Co. have a larger number of miners than before the strike.

Acceptance by virtually all miners in southern Colorado of the wage cut announced by independent companies in the last six weeks is predicted by operators. Mines have been shut in one or two places pending the inauguration of the 30 per cent cut the middle of January.

SALT LAKE CITY

Demand Is Slight—Coast Business Still Low—Miners at Wattis Vote Down Wage Cut.

Coal business is quiet. The weather is springlike and consumption is about 60 per cent of normal. Coast business has not improved. Prices remain firm and there is a plentiful supply of labor and cars.

So far wages have not been cut although there is talk of it. A mass meeting of miners at Wattis recently voted four to one against a reduction of 20 per cent. State mining officials estimate that the 1921 production will be 4,100,000 tons compared with 6,004,788, in 1920.

Southwest

KANSAS CITY

Mercury Is Agile but Coal Market Registers Hardly a Shiver—Drop in Freight Rates May Help—Dealers Stocked Heavily.

The thermometer races up one day and down the next. The first of the week we had all four seasons of the year in one day. The only thing that remains steady is the light demand for domestic grades of coal.

The recession in freight rates, particularly on grain, forage, and live stock will have some effect on business generally in this section and while no rush is anticipated a slow but steady increase in volume is confidently expected.

Steam coal continues to be in strong demand, not on account of any shortage but because the operators are unable to dispose of the coarser grades. Some changes were noticeable in the price for Arkansas smokeless.

Prices are as follows, f.o.b. mines: Kansas lump, $5; mine run, $4@$4.25; nut, $4.50; mill, $2.75; slack, $2.50; north Missouri lump, $4.25; mine run, $3.50; washed slack, $3.25; raw slack, $2.50. Arkansas lump, $6; mine run, $3.75@$4.25; slack, $2.50. McAlester Oklahoma lump, $8.50; nut, $7; slack, $2.50. Central Illinois lump, $2.50; egg, $2.25; slack, $2. Franklin County, Illinois lump, $4.25; egg, $4.05.

South

BIRMINGHAM

Turn of the Year Shows Little Market Improvement — Cold Spell of Short Duration Brings Flood of Small Retail Orders — Prices Without Material Change.

The only activity of any note in the trade the past week was due to a cold snap which lasted several days, and caused a run on local yards for domestic coal. Quite a good tonnage was moved in the aggregate, but orders individually were mostly for one ton and under, and the rush did not last long enough to relieve stocks to an extent which would enable dealers to again enter the market.

There is little if any change in the commercial market, some agencies reporting a slightly better inquiry the past week. Several ships arrived in Gulf ports and are now taking on bunker coal from this district, this line of trade having been very quiet for several weeks past. Even should industry strike a pace under which normally consumers would stock coal, it is not believed that such steps would be taken beyond the actual safety limit, due to the anticipated freight reduction, which will not materialize before April 1.

Quotations f.o.b. mines on steam and domestic are unchanged except for a rise on Cahaba domestic sizes and a decline on Carona lump and nut. These quotations now range $4.50@$6 and $4@$4.25, respectively.

LOUISVILLE

Consumption Low, but Retailers Get Better Demand—Jobbers Find Business Quiet — Production Light — Prices Fairly Steady.

Prices have been fairly steady the past week except on screenings, which are weaker as a result of lighter industrial consumption during inventory. Mines are watching for wage contract renewals in unionized fields, and some operators are not willing to take contracts, even in non-union fields.

Colder weather the end of December resulted in slightly better retail demand, but retailers have comparatively large stocks. Retail prices have been cut 50c.@$1 a ton, and are quoted thus: Eastern Kentucky, $6.75@$7.25 delivered and western Kentucky and West Virginia $5.75@$6.25 delivered.

Demand has not opened up for steam coal so far, although a few inquiries are being received. Retailers other than

the ones who carry small stocks are not buying much. A better demand is expected soon.

Jobbers report numerous low offers on spot shipments, which in some cases represent coal that has not even been mined, and which is quoted 25c.@50c. and more under the market. Mine run has been especially hard for the small mine to sell in competition with the big mines that are hungry for business. Labor is very plentiful and cheap.

General business in Louisville for the closing year showed less than an 18 per cent loss in bank clearings, the total for the year being $1,199,299,211 as against $1,556,022,712 in 1920, a loss of $356,723,501. Business at the close of the year was far more active than was the case at the close of 1920.

News From the Coal Fields

Northern Appalachian

PITTSBURGH

Demand Remains Low — Operators Determined Not to Rejoin Central Competitive Field to Make New Wage Scale.

Coal demand is as poor as at any time. There is no improvement apparent on account of its being the winter season, or on account of the commonly reported increase in industrial activity. Furthermore there is no demand traceable to expectation on the part of buyers that there will be a cessation of mining in the union fields April 1.

The test of the volume of coal demand in general is furnished not so much by the market for Pittsburgh coal, which has been extremely small right along, as by the demand for Connellsville coal, mined under open-shop conditions and at much lower cost than obtains in the Pittsburgh district. The demand for Connellsville coal has been fairly good for many months, but of late it seems to have decreased somewhat—at any rate slightly lower prices have been quoted lately, down to $1.60 for mine run on large tonnages for nearby deliveries.

Operators observe with interest the efforts of officials of the United Mine Workers to encourage the Illinois operators to bring together again the parts of the central competitive field for the purpose of wage scale negotiations. The Pittsburgh district stands by its determination not to participate, but to negotiate with their miners separately or in connection with operators of other districts in Pennsylvania, and in particular with Freeport, Butler-Mercer and central Pennsylvania.

The market remains quotable as follows: Steam slack, $1.40@$1.50; gas slack, $1.75@$1.85; steam mine run and ordinary gas, $2.10@$2.20; ¾-in., $2.60@$2.70; Panhandle 1¼-in. domestic, $2.75@3; high-grade gas mine run, $3.

CENTRAL PENNSYLVANIA

Outlook Not Promising — Demand Is Stagnant—Revision of Costs Necessary.

There is no promise of a betterment of conditions in the field for some months, at least. In speaking of the business, Secretary O'Neil of the Central Pennsylvania Coal Producer's Association, said: "There is only one thing to say now, and that it is worse." It is expected that much of the time of the next three months will be taken up on the wage dispute, although operators have received no notification from the officials of the United Mine Workers looking toward a meeting. Such as was contemplated in the Pittsburgh and Ohio fields, which was called off because the operators refused to meet the mine workers' officials.

CONNELLSVILLE

Contract Furnace Coke Market Softer —Byproduct Coke Is Cheap—Spot Market Inactive.

The contract furnace coke market presents a safer aspect. First-quarter contracts previously reported were at $3.25, $3.40 and $3.50. In the past week quotations of $3.25 have been common and it is believed the price could be shaded to $3.15 if not still more. It is generally remarked that consumers who paid $3.40 or $3.50 bought too soon. The necessary contracting is probably all completed by this time, leaving some operators without business when they would be satisfied to have it at less than $3.25. While the contracting in general has been at $3.25@$3.50 there has been some business done at less than $3.25. One contract went at $3.20, to a consumer who had been using byproduct coke from Youngstown in the last quarter of the old year, and one or two contracts that ran over Jan. 1 at higher prices have beeen adjusted to $3.15 or less to enable the furnaces involved to stay in blast.

An inquiry for 18,000 tons a month for the Trumbull-Cliffs furnace at Warren, Ohio, which was expected to go into blast about Jan. 15, went to the Youngstown Sheet & Tube Co., for byproduct coke at $2.90, Connellsville basis. It appears that the price was not forced to $2.90 on account of Connellsville competition, but to enable the furnace to blow in. The buyer takes the coke only if furnace operates, while the seller can withdraw should it find it needs the coke for its own furnaces. The seller loses on the coke, but makes up the loss by the value of byproducts. There is a 90c. freight charge to absorb on the coke. The coal usually used in making this coke is 20 per cent Connellsville and 80 per cent Pocahontas.

The spot market shows no reportable change as there has been no inquiry to develop anything. Foundry coke is in poor demand. Quotations are: Spot furnace, $2.75@$3; contract furnace, $3.20@3.25; spot foundry, $3.75@$4.50.

The *Courier* reports production in the week ended Dec. 31 at 55,260 tons by the furnace ovens, a decrease of 1,630 tons, and 33,170 tons by the merchant ovens, an increase of 830 tons, making a total of 88,430 tons, a decrease of 800 tons.

UNIONTOWN

More Coke Agreements Made — Only Short-Term Contracts Closed—Future Market Uncertain.

Some operators see in the closing of furnace coke contracts for 1922 delivery a recovery of the coke market. The price for 1922 delivery is $3.15@$3.40. The minimum figure is understood to have concerned only January delivery and the maximum figure for brands known to be of excellent quality.

All of the prices heard for new contracts are an advance over the spot market. The fact that consumers were willing to see a figure above the spot market to insure delivery of coke may have a strengthening effect upon the market.

It is also significant that no coke contracts were made for a period longer than three months, expiring March 31. It is pretty generally conceded that a labor crisis will face the industry at that time. While the Connellsville region is unorganized and therefore not directly concerned in wage negotiations in the union fields a suspension of production in the union fields will send consumers here for tonnage.

Coke and coal always being sympathetic in price, a sudden demand for coal tonnage would undoubtedly send the price of coke upward and foreseeing such a possibility producers here declined to contract for tonnage over a three months period. The uncertainty in the steel and pig iron industry especially as regards freight rates made such an attitude entirely acceptable to coke consumers.

EASTERN OHIO

Output Bounds Upward in Last Week of December But Month Total Is Low— Records on Working Time Are Better —Production for 1921 is 55 Per Cent of Capacity.

Contrary to predictions eastern Ohio produced on each of the five work days during the week ended Dec. 31 a greater daily tonnage than the average for any previous week of the month. The tonnage mined amounted to 257,000 tons or 49½ per cent of five-day capacity based on the total railroad rating of 520,000. However, during the same week of 1920, 320,000 tons were mined and the month's output is the lowest of any December in years.

Figures given out by the Pittsburgh Vein Operators' Association indicate that due to the short week, the percentage of time worked is more than that of the preceding week at mines on all railroads serving this field. Association mines worked 40 per cent of possible worktime as compared with 35 per cent the previous week. The time lost account "no market" was about 60 per cent as compared with 64 per cent last week.

Cumulative figures for the calendar year show that mines in eastern Ohio field produced 18,031,000 tons as against a potential capacity of 32,212,000 tons, or that 55 per cent of capacity was mined during the year.

One large operator ventures the prophesy that production in Ohio will continue at about the present volume throughout January, but that beginning with February considerable demand will develop, not only in increased requirements for current needs, but in purchases for reserves to be built up in anticipation of labor troubles at the mines. Demand in retail trade has been assisted materially by the colder weather which has prevailed during the past ten days.

The turn of the year finds activities in most industrial centers throughout this section somewhat diminished. The volume of freight traffic on the railroads is 35 to 40 per cent of normal. However, the percentage of coal being mined for railroad fuel is estimated between 40 and 50 per cent of normal.

Due to the continued under-production of prepared sizes at the mines, No. 8 spot slack stiffened somewhat during the week, and some small lots are reported sold at $2 per ton.

ANTHRACITE

Mines and Collieries Resume Work—Lehigh Valley Miners' Strike Is Settled on Company's Terms.

Last week showed a marked improvement in the number of collieries resuming work. All of the mines of the Glen Alden Coal Co. are again operating after a ten days' shutdown. The Temple Coal Co. has likewise resumed operations. Other companies which were only operating every other day are gradually approaching normal time.

The strike of the Lehigh Valley has been settled and the men will return to work as fast as the company opens the mines. The men were forced to accept the company's terms. This was an outlaw strike.

UPPER POTOMAC

Deadly Dull Week—Contract Shipments Curtailed—Wage Cut Is in Prospect.

The last week of 1921 was deadly dull because of curtailed contract shipments. There was no spot demand. There is a move on foot to reduce wages in order to permit operators in the Upper Potomac and Georges Creek regions to meet non-union competition.

FAIRMONT AND PANHANDLE

Last Week of 1921 Worst of Year—Spot Business Dead and Contract Shipments Cut to the Quick—Prices Remain Low.

Fairmont

The last week of 1921 was the worst of the year from a production standpoint. Not more than 40 mines were in operation and they ran not more than two days a week. There was no spot business and contract shipments were cut to the quick by the holiday and inventory period. About the only loadings during the week were for railroads.

There was so little demand for mine run that it did not bring any more than nut and slack. The price on all three grades ranged $1.25@$1.50 and on prepared, $2.15@$2.50.

Northern Panhandle

Production in the northern Panhandle was extremely low owing to the holiday lull, suspended contract orders and light railroad fuel loadings. Mines here could not compete with non-union fields. Operators having railroad fuel contracts were getting out a little coal but much less than normal. Prepared coal had no sale even at $2@$2.50 a ton and mine run was not moving at all except on contract. Slack ranged $1.25@$1.60.

Middle West

SOUTHERN ILLINOIS

Warmer Weather Floors the Coal Man—Curtailed Production the Only Hope—Railroad Tonnage Light—Prices Are Shaky.

Southern Illinois operating conditions are most trying and it is only by careful handling of the situation that the entire market does not go to pieces and all operators sustain heavy losses. The larger operators are shutting down their mines rather than produce coal at a loss. This seems to be the only solution of a bad problem.

Independents have cut their prices under the cost of production. The few mines that are working get one and two days a week. Railroad tonnage is lighter. Dissatisfaction among the miners continues to grow.

Somewhat similar conditions prevail in the Duquoin field and also in Jackson County, outside of Murphysboro. Duquoin mines, however, are not getting as much working time as those in the Carterville field that are working. At Murphysboro the Big Muddy coal is selling $4.50@$5 for domestic sizes, screenings at $2.50 and up.

Mt. Olive conditions are unusually bad. Mines are getting one and two days a week. A fairly good tonnage is moving North and Northwest of steam sizes, but domestic is hard to sell. This coal is now selling in the Kansas City market at $2.50 for domestic sizes, whereas the country price is $3.75 and the St. Louis and Chicago price $3. Screenings are worth about $1.50, when available.

There is a price war on in Kansas City on Illinois coal and one Springfield operator is reported as having 15,000 tons on the ground in Kansas City that is going to force a heavy loss.

The Standard field is in bad shape. Several mines are idle and expect to remain so until conditions improve. There seems to be no demand for either steam or domestic although steam is moving a trifle better, screenings perhaps being the best.

WESTERN KENTUCKY

Demand Slow but Prospects Brighter — Screenings Weaker — Mines Await New Wages Before Making Contracts.

Mine business has been slow the past few days, but with slightly colder weather there has been a barely perceptible improvement in prepared sizes, which has resulted in larger production of screenings. With many industrial buyers out of the market during inventory, screenings have weakened 75c. and are now at $1@$1.25 a ton.

Many mines that are paying the full union scale are finding it hard to secure business in competition with non-union mines. Some of those who have made private arrangements with labor, are competing with the eastern Kentucky mines which are not unionized and which have reduced prices.

Railroads are not even taking their contract requirements. However, December business was larger than had been anticipated. Some of the mines are taking long contracts because of the uncertainty concerning wages.

Southern Appalachian

SOUTHEASTERN KENTUCKY

Mines Start Cautiously—Oversupply of Labor—Market Still Weak.

While the first week of the year brought little increase in new business over the latter half of December, coal men are more optimistic. Several mines in Harlan and Bell counties that have been closed for thirty days or more are starting up, most of them, however, on reduced output.

In several instances where mines have been down so long, men are needing work badly. One of the larger operations that had been down for some little time had five applicants for every place when starting up on Jan. 2. The 1917 scale of wages is now in effect at practically every mine.

Prices quoted are: Four-inch block, $2.75@$3; egg, $2.25@$2.50; nut and slack, $1.25@$1.35; mine run, $1.65@$1.75.

Middle Appalachian

LOW-VOLATILE FIELDS

Holiday Lull Falls Heavily Over These Fields—Operators Look for Renewed Tidewater Business Soon.

New River and the Gulf

New River mines got production up to about 12,000 tons a day during the latter part of the final week of 1921, but the week's output was the worst of the year. About all that was moving was a little mine run on contract.

Lump brought $3@$3.50 but little was sold. Mine run was $1.60@$1.75. Most of the mines were shut down but there is promise of resuming at lower wages soon. Operators also look forward to a little better Tidewater business.

Operations in Gulf territory stopped during the holidays. However, men here think the accumulation of coal at Tidewater is going down so that movement to the Atlantic piers will soon start. Prices are lump, $3; egg, $2.65; mine run, $1.60.

Pocahontas and Tug River

Pocahontas production was somewhat less than usual during Christmas week. There is no spot business to replace the reduced contract movement and no market for any grade except nut and slack. Quotations are: Slack, $1.25@$1.50; mine run, $1.60@$2; prepared, $3@$3.50. There was a slight improvement in tonnage destined for New England.

Tug River tonnage suffered the usual holiday drop. Most of the mines shut down Dec. 26 and when they opened miners were slow in getting back to work. Market demand is slight. Prices are the same as those in Pocahontas territory.

HIGH-VOLATILE FIELDS

Mine Closings General in Last Week of Year—Spot Market Dormant—Screenings Rise with Scarcity of Supply.

KANAWHA

The final week of the year was discouraging. Production did not exceed 8,500 tons a day. Spot buys were few and even shipments on contracts were cut.. Prepared was in no demand at all. Mine run was quoted as low as $1.25 and lump never brought over $2.50. Nut and slack prices were $1.25@$1.50. Most mines are shut down.

NORTHEASTERN KENTUCKY

With consumers engaged in taking their annual inventory, there was little business in the last week of the year. Not only were contract shipments light but at the same time there was little or no spot demand except for screenings which were not available because of the low production of prepared. This scarcity made for firmer prices, the range being $1.25@$1.50.

LOGAN AND THACKER

Output during the final days of 1921 was low although Logan mines managed to produce 37,000 tons a day. The demand for domestic coal was dormant. Hence the production of nut and slack was limited. Much of the output was shipped to Western markets, Eastern consignments being confined to railroad fuel loadings.

With contract shipments cut down during the holiday week, Williamson operations were more or less limited. There was no sale in the open market nor were the railroads using quite so large a tonnage. No-market losses were still in excess of 150,000 tons per week. Prices did not vary much as compared with those prevailing in other southern West Virginia high-volatile fields.

VIRGINIA

Holiday cessations made for a slight reduction in the output. Shipments on standing orders were not quite so large as usual. There was comparatively little call for spot coal, although producers were receiving a few inquiries for slack. Prices remained about the same with mine run around $2.

News Items From Field and Trade

COLORADO

The management of the **Colorado Collieries Co.** has been blamed by a coroner's jury for the disaster at its Satanic Mine, at Morrison, in which six miners lost their lives. The jury returned a verdict of declaring that the "accident might have been averted by a proper and legal system of ventilation operated by the management of the mine, as provided by law." The miners died from asphyxiation from gases emanating from a fire while they tried to place a bulkhead to seal up the fire zone.

The Monarch Mine is planning the rebuilding of its tipple, recently destroyed by fire.

Notice of a 10 per cent wage cut, effective Jan. 16, was posted by the **Colorado Fuel & Iron Co.** recently at the company's Pueblo steel mills and the Arkansas Valley Conduit, which is the water company supplying the mills. This is the third reduction in a year, and brings the scale to a point 34 per cent below the wartime peak and 65 per cent above pre-war level. Approximately 1,800 men are affected at present. In normal times the mill employs 7,500 men. Coincident with the announcement, company officials gave notice of a 15 per cent reduction in house rents and a reduction in hospital rates. No indication has been given of the attitude of employees regarding the new wage scale.

ILLINOIS

Following is the itinerary for January of the **Illinois Miners' Examining Board:** Decatur, Jan. 5; Danville, Jan. 7; Canton, Jan. 9; Peoria, Jan. 10; Springfield, Jan. 11; Gillespie, Jan. 12; Collinsville, Jan. 13; Coulterville, Jan. 14; Duquoin, Jan. 16; Harrisburg, Jan. 17; Marion, Jan. 18, and Benton, Jan. 19.

The Franklin Machine & Electric Co. is the name of a new company recently organized in West Frankfort. The concern will handle a complete line of mine supplies and will do general machine and electrical work.

E. Hickman, Belleville, now holds the position of mine manager of the Missouri Illinois Coal Co.

A. E. Poirot, coal inspector of the Eldnar Coal Co., is now located in Belleville.

Work is progressing rapidly on the sinking of the two shafts of the **Chicago, Wilmington & Franklin Coal Co.'s** mine at West Frankfort. The mine, which will be known as Orient No. 2 will rank in capacity and equipment with Mine No. 1 which at the present time holds the world's record for hoisting coal.

The Paradise Coal & Coke Co., called the mine rescue team out recently to help fight a fire which broke out in the workings at Duquoin. Part of the mine was sealed off in an attempt to smother a former fire but in some manner the fire broke through necessitating help from the outside.

The Franklin Coal Co. has increased its capital stock from $50,000 to $150,000.

Edwin R. Keeler, vice-president of the Taylor Coal Co., has been appointed chairman of the Chicago Association of Commerce, coal sub-division. **Edward Zipf,** president of Zipf Brothers Coal Co., has been appointed vice-chairman.

J. B. Pauley, vice-president of the J. K. Deering Coal Co. is seriously ill at his Chicago home suffering from a fever believed to have been contracted while in Mexico recently.

Two mines at Equality, the **Hickory Hill** and the **West Side** are reported to be shut down and the property in the hands of a receiver. John W. Shaw of Harrisburg has been appointed receiver and is now at the property supervising what work is still being done. The West Side is filling up with water and the company has not been able to keep any pumpmen on the job. According to the report, the men employed have not received any pay for the last three two-weekly pays.

John C. Nusbeck, formerly with the New York Central, has been appointed sales manager for the Atlas Coal & Coke Co., Chicago.

Mine No. 18 of the **By-Products Coal Co.,** at West Frankfort, which is under control of the Peabody interests, was closed down Dec. 20, and no definite time was given by the company as to when the plant would be reopened. This mine is one of the largest and oldest of the Peabody properties and its closing is attributed to the inability of the producers to offer coal on the market at prices approximating those quoted by producers in other coal fields.

The Nason Coal Co., of Chicago, has recently purchased two more large tracts of coal land in Elk Prairie township, near Ina. The company already owns two other tracts in that same location.

W. B. Miller, superintendent of Mine 18 at West Frankfort, has resigned his position after several years of service. He is one of the best known coal men in southern Illinois, having worked for various mining companies throughout Williamson and Jackson counties.

The city of Murphysboro has filed suit against the **Gartside Coal Co.,** of that city for $10,000 damages caused to certain streets in the city. The city alleges that the mine workings have caused a subsidence of paving.

E. L. May, president of the General Coal & Mining Co., Freeburg, is now sales manager for the Fidelity Coal Co., of St. Louis, which has the exclusive sales agency for the General Coal & Mining Co.

The Old Ben Coal Corporation has begun cutting down expenses in the way of closing certain mines in the southern part of the state. Mine No. 12 at Christopher and No. 17 at Johnson City were closed on Dec. 20. It is said that the company might soon shut down others of its twelve mines in Franklin and Williamson counties. It is reported that other operators are now contemplating closing down, some being already forced to do so by the poor market conditions and strong competition from non-union fields.

INDIANA

A deal for the purchase of a 1,620-acre tract of coal land a short distance from Evansville, on the Big Four R.R., by the **Columbia Coal Co.,** is nearly completed. The land is owned by **T. C. Bugg,** secretary and general manager of the Commercial Coal Co. The Columbia company will buy land adjoining the Bugg tracts. The new mine probably will be situated about a mile and one-half east of Buckskin. The Columbia company formerly owned mines in Franklin County, Ill., and now has mining interests at Christopher.

The closing of the operation of the Brazil division, Chicago & Eastern Illinois R.R., will prove a hardship to the **Crawford Coal Co.,** as it has several holdings north of Brazil which will be left without railroad connections. Other mines in the Brazil territory have switches operating from the Big Four. The Brazil Division was originally known as the Chicago & Indiana Coal R.R. and formerly was a large carrier of coal from the Indiana fields to Chicago. The Indiana Public Service Commission is doing everything possible to save the road, and says that injunction proceedings will be instituted if the road is not operated after Dec. 30.

Reassessment by the state board of coal companies in Warrick County is as follows: Big Four Coal Co., Boonville, assessment decreased from $35,000 to $30,000; Bosse Coal & Mining Co. and Bosse Coal Co., Evansville, increased from $82,000 to $100,000; Boonville Mining Co., increased from $59,775 to $65,100; Cypress Creek Coal Co., increased from $98,860 to $106,750; Elberfeld Coal Co., increased from $75,000 to $100,765; Erie Canal Coal Co., Boonville, increased from $80,330 to $84,485; Sargent Coal Co., Newburg, increased from $42,485 to $45,000; Possum Ridge Coal Co., Evansville, increased from $40,000 to $50,000; Warrick Coal Mining Co., Boonville, increased from $97,170 to $107,000; J. Woolley Coal Co., Evansville, decreased from $30,000 to $25,000; Pigeon Creek Coal Co., Boonville, increased from $85,000 to $100,000.

The Division of Geology of the State Department of **Conservation** has prepared a new map of the Indiana coal fields. The outcroppings of the more important veins, together with their approximate locations are shown. The map further shows the Eastern limit of the coal fields in detail together with the outcrops of veins known as Nos. 3, 5 and 7. An insert map of the state shows the area and size of the coal fields with respect to the entire commonwealth. Coal is found in twenty-seven counties in the state in an area of about 7,000 square miles. The map is based on data collected by the geological survey for many years.

KENTUCKY

The Kelso Branch Coal Co., Denver, a few miles from Paintsville, has been chartered with a capital of $25,000, by Paris, Labe and Eliza Polphrey.

The Kentucky Block Coal Co. recently suffered a $20,000 fire loss of its machine shop, head house, two motors, mining machinery, etc., at its plant on First Creek. Incendiarism is suspected.

Following weeks of general depression throughout the east Kentucky coal fields, many of the mines have resumed operations. Among them are the **Consolidated**

Fuel Co., having mines near Dalna and Blackey, in the Smoot Creek territory; the **Consolidated Coal Co.** in the Jenkins-McRoberts section and the **Elkhorn Coal Corporation** in the Fleming-Haymond-Hemphill sections.

Prospects for a return of river business are improving. With shipments to the Pittsburg Fuel Co., Louisville, a few days ago representing the first Pittsburg coal arriving by water in eight years, and increased water movement from West Virginia, also some coal from eastern Kentucky via the Kentucky and Ohio Rivers, the situation is looking brighter. One company was formed a few weeks ago to bring coal by water to Louisville, and reload to cars for delivery around Louisville.

NEW YORK

H. L. Harnden, who was connected with Garfield & Proctor Coal Co., New York, has become associated with The Tuttle-Burger Coal Co., Woolworth Bldg. He will look after the bituminous department of the company. Another addition to the Tuttle-Berger Co. is **K. F. Cramer**, of Hartford who has been appointed Connecticut representative. He will also cover part of Massachusetts.

J. B. Roberts, the Buffalo representative of the Nicholson-Smith Coal Co., of Cleveland, has resigned to take the position of sales manager of the Cleveland & Buffalo Coal Co., Buffalo. The Nicholson-Smith Co. will retire. The office has been taken by the Graves Coal & Coke Co., organized recently by Charles E. Graves, for several years manager of the bituminous trade of E. L. Hedstrom.

The United Fuel & Supply Co., Buffalo, a retail concern that formerly did a large business on the co-operative plan, with a considerable number of consumers as stockholders, has gone into voluntary bankruptcy, giving as assets $73,702.41 and as liabilities $57,925.94. The move was precipitated by judgments filed by independent anthracite operators in Wilkes-Barre.

Among charters granted recently was one to **C. W. Proctor** to engage in the coal and wood business in Islip, Long Island, with a capital of $25,000. The other incorporators are given as E. C. Proctor and D. D. White. Mr. Proctor is the president of the Calumet Coal Co. with New York offices at 17 Battery Place.

Lippincott, Mills & Co., Inc., has been granted a New York charter to deal in coal, coke, ores, scrap, iron and steel products and ferro alloys, and to do a general importing and exporting business. The new company has offices at 17 Battery Place, New York and in the Hippodrome Bldg., Cleveland. G. W. Lippincott, head of Lippincott & Co., wholesale coal dealers, Cleveland, is president. William H. Mills, New York, who retired three years ago as president of Naylor & Co., is vice president and treasurer. A. L. Irwin, of Lippincott & Co., Cleveland, is vice president. P. L. Smith, New York, for nineteen years identified with Naylor & Co., resigned to become secretary of the new company.

A petition in bankruptcy has been filed in the United States District Court, New York City against Leander D. Lovell and Frederick C. Sheldon, doing business as **Borden & Lovell.** The creditors and their claims are Sackett Coal Co., $7,500; M. & J. Tracy, $38, and United States Trucking Co., $134. Judge A. N. Hand has appointed Percival Wilds receiver, with a bond of $1,000.

The Wabash Fuel Co., Buffalo, has gone into voluntary bankruptcy. The schedule filed shows liabilities amounting to $70,966 and assets of $41,446. The company did a heavy business in the active bituminous trade of the summer and fall of 1920, but is said to have sold to all sorts of people and carried on business in a loose way generally.

W. B. Watchler, until recently manager of the Chicago district for the industrial bearings division, Hyatt Roller Bearing Co., has been promoted and transferred to the New York headquarters of the division as engineer in charge of general applications.

OHIO

Sales representatives of the **S. J. Patterson Coal Co.**, with offices in Dayton, and one of the largest distributors of Pocahontas coal in the United States, held their annual convention late in December. At a dinner given at the Dayton Country Club, R. D. Patterson made an address in which he outlined the plans of the coming year.

Dexter & Carpenter, Inc., are opening an office at Cincinnati in charge of George M. Carpenter, Jr., formerly associated with the Chesapeake & Ohio Coal & Coke Co., as Western sales manager.

C. A. Albright, of the Albright Coal Co., was named president of the retail coal dealers' board of the Cleveland Chamber of Commerce at the annual election. **E. C. Brown, of Brown Bros. Coal Co.**, was named vice-president; **J. E. Anderson** of the Cuyahoga Coal Co., treasurer, and **F. J. Vasek** was re-elected secretary. All are prominent in Cleveland coal circles and have been in the coal business in Cleveland for many years.

The Lomi Coal Co., Cadiz, owning large stripping operations, has contracted with the Roberts & Schaefer Co. for the complete installation of conveying, tipple and loading equipment.

The Warner Collieries Co., Cleveland has contracted for a complete installation of Marcus steel tipple with loading booms at their new mine at Fairpoint.

OKLAHOMA

In addition to much drilling by the **Central Coal & Coke Co.** to locate coal east and southeast of Centralia, Craig County, there now is to be a general drilling campaign northwest of that place by **S. E. Banzet**, who has just completed the purchase of options on 10,000 acres of prospective coal land. Banzet represents parties interested in the building of a railroad through that section and if coal is found to underlay this land a railroad may be expected to follow the prospecting.

PENNSYLVANIA

In the Johnstown District the old firms are still in existence, but a large number of those establishing themselves in business during the rush have pulled up stakes and are gone. The firms that opened offices in Johnstown during the high price period and which closed during 1921 are: **The Blair Park Coal & Coke Co.; the B. Nicol Co.; Campbell, Peacock & Kinzer Co; Produce Fuel Co.; Swayne & Co.; International Fuel & Iron Co.; Coale & Co.; Butler Coal Co.; Eastern Coal & Coke Co.; M. F. Lersch & Son; Sieler Coal Co.; Knickerbocker Fuel Co.; Wright, Gibson & Co.; Alden Coal Mining Co.** and **Frame, Friend and Stineman.**

The Somerset-Cambria Coal Mining Co., with headquarters in Johnstown, has purchased a tract of 110 acres in Somerset County one mile from Somerset. An option has also been taken on an additional 500-acre tract. The company will centralize operation in one shaft which is located within 200 feet of the main line of the B. & O. railroad. R. H. Speicher is president.

The Flenner Coal Co. at South Fork, has closed its operations indefinitely. The company employed fifty men and supplied the Pennsylvania with coal for the engines on the South Fork branch. The present contract at $2 per ton has expired and the company refuses to pay above $1.75.

The Forks Coal Mining Co. has taken over the operation of the **South Fork Bituminous Coal Co.**, at South Fork and has placed it under the management of R. H. Moore of Portage. The South Fork company operated one mine with 80 men. The Forks company has now three mines and will employ 400 men. The Forks concern operates nine mines in Cambria County, with a total of 1,200 men.

The Lehigh & Wilkes-Barre Coal Co. has sunk a new slope into workings of the Tresckow Mines close to a portion worked out many years ago by primitive mining methods. Although abandoned for almost half a century, the corporation will reopen the section and retimber it.

Three mine officials were seriously burned in a gas explosion in No. 3 slope of the **Susquehanna Collieries Co.** in Newport Township. A pocket of gas was ignited during an inspection tour. The burned men were taken at once to Nanticoke State Hospital.

J. W. Howard, of Clarksburg, having severed his connection with the J. E. Long Coal Co., has become identified with the Thomas N. Mordue Co., with headquarters in Pittsburgh.

An interesting meeting was held in Nanticoke recently relative to a revival of the **Nanticoke Mining Institute**, a conference being held with Mr. Loomis of the State Department of Education, in charge of vocational work in the anthracite region. A syllabus of studies is to be prepared by a committee conferring with Mr. Loomis.

A. J. Musser has been appointed general manager of the Clearfield Bituminous Coal Corporation, with headquarters at Indiana, succeeding **H. B. Douglas**, assigned to other duties.

Fire recently destroyed the tipple at the Tremont Mine of the **Pittsburgh Coal Co.** near Fayette City, entailing a loss of $20,000.

E. J. Myers, representing the Wholesale Coal Co., Pittsburgh, is calling upon the trade formerly visited by **W. B. Sneathen**, who is spending the winter in California.

Alvan Markle, of Hazleton, chairman of the anthracite joint scale committee in 1916 and 1920, sails for Europe at the end of this month as special assistant to the Postmaster General, by appointment of President Harding, to study postal savings systems in Great Britain, France, Italy, Belgium and Holland. He will return some time in February. Mr. Markle was appointed as a representative of Pennsylvania banking interests in the conference on improving the United States postal savings banks, held at Los Angeles, Cal., earlier this year.

The new **Anthracite Mine Cave Commission**—J. B. Smith, Philip R. Bevan and T. H. B. Lyon—visited Harrisburg recently and called upon Attorney-General Alter to get information relative to their powers. As nobody seems to have accepted the Fowler act, under which the commission was constituted, the appointees are in the peculiar situation of holding positions but having no real jobs. Mr. Alter told the members that their work would be necessarily limited until the Supreme Court had passed upon constitutional questions with respect to anthracite legislation, but the commission nevertheless called on the Governor to thank him for the appointments, and later collected a mass of information on anthracite mines at the State Department of Mines.

Business in the Connellsville coke region is declining. The 4,000 ovens fired about a month ago by the **H. C. Frick Coke Co.** are now working only three or four days a week. **W. J. Rainey, Inc.**, has put its ovens at Allison out and is now shipping all coal from that plant. **The Hillman Coal & Coke Co.** has put out ovens at its Isabella plant, shipping all coal and running mostly on river shipments. The river mines of the H. C. Frick company are running full, shipping coal by river to the Clairton byproduct plant of the Carnegie Steel Co.

TENNESSEE

Settlement of the labor trouble in the Knoxville coal district will give temporary work to 12,000 miners and reopen 200 mines in Kentucky and east Tennessee.

The Tennessee Consolidated Coal Co., Palmer, has just completed its revolving dump, at its cross-over tipple, and has also finished the installation of new power-house equipment. It is proposed to bring all the coal from the four openings by motors to one tipple, and when this is done its daily capacity will be from 1,500 to 2,000 tons.

The Tennessee Supreme Court has sustained the decision of Chancellor Garvin of Hamilton County in the case of the Equitable Trust Co. of New York against the **Dayton Coal & Iron Co.**, of Dayton, whereby the chancellor held the stockholders of the company liable for debts aggregating $500,000. The Bank of Scotland in Glasgow, Scotland, is the principal stockholder of the company, hence is liable for the debts.

TEXAS

The Calvert Coal Co., operating a number of mines near Rockdale, is arranging for the opening of a new mine near Bremond, Robertson County, and equipment for this purpose will be installed at an early date. The company has over 1,300 acres of land in this district and plans for extensive operations. J. B. Robinson is manager.

UTAH

Emil Ostlurd, of Castle Gate is now connected with the Utah Fuel Co., in the capacity of mine inspector.

The Salina Coal Co. of Salt Lake City has been authorized by the State Securities Commission to sell $450,000 worth of additional bonds. The company has a capital of $1,000,000.

Joseph Sheya, of Price, has sold 40 acres of coal land on Gordon Creek to the **Great Western Coal Co.** Consideration is $10,000

John Thorpe, of Winter Quarters, is now mine superintendent of the Utah Fuel Co.

Utah coal, coke and iron properties have been merged in a $25,000,000 corporation with **W. E. Creed** of Pittsburgh, of the Columbia Steel Co. and Pacific Gas-Electric Co., as the head.

The Lion Coal Co. of Ogden is to sell its title to two and one-half miles of railroad spur connecting the coal properties at Wattis with the line of the Utah Ry. at Wattis Junction, the purchaser being the latter company. The consideration is $200,000. The line was built during the war and the rails were purchased in Belgium through the efforts of John M. Browning of Ogden, inventor of the Browning pistols.

WASHINGTON, D. C.

Insufficient fuel funds have caused the Navy Department to abandon the joint maneuvers of the Atlantic and Pacific fleet which were scheduled to be held at Panama Bay in February and March. The Department last year asked Congress for 30 million dollars for fuel for the year which began July 1, 1921, but the appropriation was cut to 17½ million dollars and a deficiency of 12½ million dollars was recently refused by the House Appropriations Committee, which insisted that the Navy should keep within Congressional allotments.

The Bureau of Mines announces that tentative recommendations for international standardization of mine rescue and recovery operations in coal mines have been practically completed by a subcommittee of the Mine Rescue Standardization Committee.

Opposition to the decree of the District Court for the Eastern District of Pennsylvania in the disposition of shares of stock of the **Philadelphia & Reading Coal & Iron Co.**, is made by the Continental Insurance Co., and the Fidelity Phenix Fire Insurance Co., of New York, in a brief to the Supreme Court, which will hear this case in January. It is contended by the insurance companies that the disposition of the stock is inequitable to the common stockholders of the Reading.

In the tariff hearings before the Senate Finance Committee opposition was manifested to a duty on Cuban sugar on the fround that it would affect coal exports to Cuba, which are estimated at about $13,000,000 worth of bituminous coal a year.

Sanitary surveys have been made of some of the mining camps in the States of Illinois, Kentucky, California, Arizona and Utah, by the **Bureau of Mines**. Reports calling attention to good and bad sanitary conditions, with specific recommendations for the betterment or correction of the latter, have been forwarded to those most vitally interested, after having been reviewed by engineers and sanitarians in the Washington office.

WEST VIRGINIA

William O'Toole, of Gary, has accepted the post of minister to Paraguay. The new minister is vice-president and general manager of the Central Pocahontas Coal Co. Mr. O'Toole is arranging his affairs with a view to leaving for Paraguay in the near future.

Charleston capitalists have launched the **Stone Cliff Collieries Co.** with general headquarters at Charleston, this concern being capitalized at $50,000. Principal stockholders are C. A. Brockman, Lucy W. Brockman, T. P. Watts, E. H. McNeil and A. S. Guthrie, of Charleston.

Operations are to be conducted in the vicinity of Henry in the Upper Potomac field by the newly organized **Superior Splint Coal Co.**, in which West Virginia and Pennsylvania capitalists are interested and which has a capital stock of $150,000. Leading figures in the new company are McClelland Leonard, George Whyle, Harold Hutchinson, of Uniontown, Pa.; Parley De Berry and O. L. Hall of Clay, W. Va.

All the mines of the **West Virginia-Pittsburgh Coal Co.** in Brook County, have been closed down because the company is unable to compete with non-union mines. For the time being 800 men will be out of employment.

George Wolfe, secretary of the Winding Gulf Operators' Association, accompanied by his wife, spent the Christmas holidays with relatives and friends in Jacksonville, Fla., not returning to the field until the first of the year. He took advantage of the general shutdown of mines to visit a part of the country where he spent his boyhood and which he had not seen for thirty years.

George M. Jones, Herbert Jones and associates of Huntington have purchased the property of the **McGregor Coal Co.**, at Slagle, including 3,500 acres of coal for a price said to approximate $650,000.

A total of 450 acres of coal in the Waynesburg seam on Doll's Run, tapped by the Morgantown & Wheeling, has changed hands, having been secured by the **Alliance Coal Co.**, of Bluefield. The land was sold by David Brewer, Clark and David Lemley, Calvin Morris and others, the deal being made on a royalty basis instead of a cash transaction. Plans are under way to develop the property without delay and to have a mine in operation by spring. The original owners have reserved the rights to the Sewickley and Pittsburgh veins in the tracts sold.

The Tug River Collieries Co. of Williamson has increased its capital stock, under authority of the secretary of state of West Virginia, from $25,000 to $50,000. Permission has been granted by the same official to the **Lindsey Coal Mining Co.** to do business in West Virginia.

C. H. Jenkins, treasurer of the Hutchinson Coal Co. was a visitor in Washington and in Logan the week before Christmas. At Washington he attended a meeting of the Railroad Relations Committee of the National Coal Association.

An injunction has been granted by Judge Lazelle of Monongalia County, enjoining the **Fiedler-Davis Fuel Co.** and Stanley H. Fiedler from distributing and disposing of the property and assets until an action in law by the **Browning Coke Co.** to recover $1,826.29 has been decided. This injunction was granted upon the application of counsel for the Browning company.

J. C. Evans, secretary and sales manager of the Fairmont Mining Machinery Co., has tendered his resignation to become connected with the Huntington Supply & Equipment Co. Mr. Evans will make his headquarters at Bluefield.

Operations have been resumed at the plant of the **Beechwood Coal & Coke Co.**, at Claremont in the New River field after an idleness covering a period of several weeks. Employes petitioned the company and voted to accept a reduced wage.

The Wythe Block Coal Co., of Huntington, with mining operations and mineral land holdings in Webster County, has been thrown into involuntary bankruptcy in Federal court on the petition of the firm of Thomas Rich & Co., Lanesbottom Bank and George R. Morton of Camden. The court granted the petition and has designated George R. Morton to act as receiver.

Glen Rogers is to be the seat of the **Raleigh-Wyoming Coal Co.**, and this will rank as one of the biggest operating companies in the Wyoming County field now undergoing such rapid development. Boston capitalists are largely interested in this company which has spent the last two years in getting its holdings in Raleigh and Wyoming counties ready for development. Shipments will begin as soon as the Virginian completes an extension from its main line at Maben to Glen Rogers. Construction work has been completed on a brick plant with a capacity of 25,000 brick a day and a million dollar power plant is now under construction.

A. J. Salzer of the Southern Coal Corporation of Fairmont was a visitor at Weston a day or so before Christmas.

CANADA

The Dominion Bureau of Statistics has issued a statement giving the output of coal in Canada during 1921 as 14,727,044 net tons, December production being estimated. The output in 1920 was 16,631,954 tons. All the provinces show decreases except British Columbia, the output of which is slightly increased. Alberta heads the list with a figure of 5,763,145 tons, as compared with 6,833,500 tons in 1920, and Nova Scotia's production was 5,580,722 tons, as compared with 6,420,291 tons for 1920.

Traffic News

The I. C. C. has suspended until May 29 proposed reductions in rates on bituminous coal from Kentucky, Tennessee and West Virginia mines on the L. & N. to destinations on the Southern Ry. in Indiana and Illinois.

The commission assigned for hearing at Washington, Jan. 11, the proposed reduction of 5c. per ton on coal from Alabama, Kentucky and Illinois mines to Gulfport, Miss., when for bunkerage, for export, or when for points in Florida and Texas accessible by water, but an increase of 20c. per ton when handled through tipple for other purposes.

The Supreme Court of Ohio, in a recent decision, held that any railroad operated in Ohio, no matter how short a line must be open to everybody's traffic, and ordered the **Dillonvale & Smithfield Railroad Co.**, Jefferson County to cease accepting only shipments of the **United States Coal Co.** The line runs from Dillonvale to Bradley, serving the operations of the United States Coal Co. Bradley is a mining town and the Dillonvale & Smithfield had not in the past furnished service to the general public.

Recent Patents

Drill Sharpener. Edward O. Oldham, Denver, Colo., assignor to Denver Rock Drill Mfg. Co., Denver, Colo., 1,394,214. Oct. 18, 1921. Filed Jan. 7, 1919; serial No. 270,050.

Hopper Car. Mark A. Villiamo, New Castle, Pa., 1,392,371. Oct. 4, 1921. Filed Nov. 3, 1920; serial No. 421,522.

Apparatus for Handling Coal. Charles Williamson, Chicago, Ill., 1,392,382. Oct. 4, 1921. Filed Aug. 9, 1917; serial No. 185,402.

Trade Catalogs

Cadillac Portable Electric Blower—Clements Mfg. Co., Chicago, Ill. Description of small blowers for use in keeping machines free from dust.—Advertiser.

Sullivan Air Lift Pumps—Sullivan Machinery Co., Chicago, Ill. Bulletin 71-G. Pp. 40; 6 x 9 in.; illustrated. Description of the Sullivan Air Lift Pumping System.—Advertiser.

Obituary

Word has been received of the death of **William Alexander McIntosh**, pioneer coal operator and banker in Pittsburg 35 years ago. He died at his cottage on the Gilbert estate at Grims Dyke, Harrow Weald, 10 miles outside of London, in his eighty-fifth year. Old-time Pittsburgers will recall the elder McIntosh as an associate of Andrew Carnegie, William Coleman, John Walker and other pioneers in banking and the coal and steel industries in Pittsburg.

John Holden Thomas, an official of the Philadelphia and Reading Coal & Iron Co., dropped dead recently near Wiconisco. He is survived by five sons and three daughters.

Coming Meetings

American Wood Preservers' Association will hold its annual meeting on Jan. 24, 25 and 26 at the Hotel Sherman, Chicago, Ill. Secretary, G. M. Hunt, Madison, Wis.

American Institute of Electrical Engineers will hold its midwinter convention in New York City, Feb. 15, 16 and 17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

American Institute of Mining and Metallurgical Engineers will meet on Feb. 20 to 23 in New York City. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

The American Institute of Consulting Engineers, Inc., will hold its annual meeting Jan. 16, 1922, at the Engineers' Club, 32 West 40th St., New York City. Secretary F. A. Mollitor, 35 Nassau St., New York City.

Southern Appalachian Coal Operators' Association will hold its next meeting Jan. 27, 1922, at Knoxville, Tenn. Secretary, J. E. McCoy, Knoxville, Tenn.

Pittsburgh Vein Operators' Association of Ohio will hold its annual meeting on Feb. 13, 1922, at Cleveland, Ohio; D. F. Hurd, secretary.

Tug River Coal Operators Association will hold its annual meeting at Welch, W. Va., on Jan. 18, 1922. Secretary, C. C. Morfit, Welch.